EXHIBIT B48

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

IN RE: JOHNSON & JOHNSON TALCUM POWDER PRODUCTS MARKETING SALES PRACTICES, AND PRODUCTS LIABILITY LITIGATION) MDL NO.16-2738(FLW)(LHG)

VIDEO-RECORDED DEPOSITION OF

WILLIAM E. LONGO, PH.D.

February 5, 2019

10:24 a.m.

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Johns Creek, Georgia

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(Reporter disclosure made pursuant to Article 10.B. of the Rules and Regulations of the Board of Court Reporting of the Judicial Council of Georgia.)

(Identification statement by videographer.)

10:21:28 WILLIAM E. LONGO, PH.D.,

having been first duly sworn, was examined and testified as follows:

EXAMINATION

BY MR. CHACHKES:

10:23:51 **Q.** Good morning, Dr. Longo.

10:24:24 **A. Good morning.**

10:24:25 **Q.** And my name is Alex Chachkes; I represent J&J. We've met before; right?

10:24:31 **A. Yes, sir, we have.**

10:24:32 MR. CHACHKES: Okay. I want to begin the depo with an objection to the late productions. On Saturday we received a new 92-page report and almost 7,000 pages of new back-up material. On Sunday we received supplemental reports, two new reports from J3 and hundreds of other pages.

10:24:50 So when we conclude today we are going to expressly keep the deposition open subject to our analysis of the new production; and if it

turns out that it is material that if we had gotten earlier we would have asked about today, we are going to recall the witness.

MS. O'DELL: Well, we would object to any motion to hold the deposition open. The requests that were made for data that was supplied on Saturday and earlier in the week were late requests, actually only received five or I think it was seven days beforehand, they were timely produced, and you've had sufficient time to review them.

The supplement that you're referring to that was produced on Sunday corrected a couple of typographical errors and clarified the identification of a sample, none of which is sufficient to hold the deposition open, so we are going to oppose any such motion. Today's your opportunity to depose Dr. Longo on these samples.

MR. CHACHKES: Obviously, we disagree, and we thought that material should have been produced and we should not have to fight for it, but it's a fight for another day.

So we've premarked some exhibits, some things I'm sure we will be coming back to later.

What I want to do is maybe just go through those quickly so they are on the record.

(Defendants' Exhibit 1 was marked for identification.)

Q. (By Mr. Chachkes) Dr. Longo, you can confirm what's been marked as Exhibit 1 is your CV; is that correct?

A. Yes, sir.

Q. And are there any updates to this since we received it?

A. No, sir.

(Defendants' Exhibits 2 and 3 were marked for identification.)

Q. (By Mr. Chachkes) Okay. What's been marked as Exhibit 2 is your January 16 expert report extracted --

MS. O'DELL: November 14.

Q. (By Mr. Chachkes) I'm sorry. What has been marked as Exhibit 2 is your November 14 expert report in this matter minus the backup data.

Can you confirm that?

A. This is actually the January 15.

Q. So --

A. November 14 is Exhibit 3.

Q. All right. Let's do that again.

So Exhibit 2 is your January 16 expert report in this matter minus the backup data that was attached to it when it was produced; is that correct?

A. Yes, sir.

Q. Okay. And then Exhibit 3 is your November 14 report in this matter which was, I assume, superseded by Exhibit 2; correct?

A. Correct.

(Defendants' Exhibits 4, 5, and 6 were marked for identification.)

Q. (By Mr. Chachkes) Okay. What's been marked as Exhibits 4, 5 and 6, can you confirm that these are ISO 22262-1, -2, and -3?

A. Yes, sir.

Q. So 1 will be 4, 2 will be 5, and 3 will be 6.

(Defendants' Exhibit 7 was marked for identification.)

Q. (By Mr. Chachkes) And then what's been marked as Exhibit 7 is your second supplemental report minus the backup data that was attached to it dated February 1, 2019; is that correct?

A. Yes, sir.

Q. And it's my understanding that this report supersedes what's been marked as Exhibit 2; is that

correct? So it supersedes the January report?

A. Yes, sir.

Q. And my understanding is that the only difference between Exhibit 7 and Exhibit 2 is Exhibit 7 corrects some typos?

MS. O'DELL: Object to the form.

THE WITNESS: The second supplement report, essentially it was to clarification on the Lee Poye J&J STS samples, 31F and 31G, and it is J&J sample -- hold on, I want to get the right numbers. Throws me off on two-sided. 77.

Q. (By Mr. Chachkes) That's okay. You've given me the 31F and 31G. So am I correct in my understanding that Exhibit 7 does more than correct typos?

A. Yes. Exhibit 7 does not have any new analytical data. The two samples that Lee Poye had -- and I will just give the numbers -- the 31F and the 31G I misunderstood. I thought that was actually two samples from the same container.

It's actually one sample from two different containers. The STS in it looks like a gift wrapped for the spice and the regular. So that's actually two containers for each sample. So the number of containers was increased.

10:30:13 **But the analytical data had been already**
10:30:16 **produced. Nothing changed in the analytical data.**
10:30:19 **And then we had some typos that we endeavored to**
10:30:24 **correct.**
10:30:24 **Q.** Okay. And those are typos you found or
10:30:26 that counsel found?
10:30:29 MR. CIRSCH: Object to form.
10:30:31 THE WITNESS: Well, one of them counsel
10:30:33 found, and that was the counsel for Johnson &
10:30:35 Johnson, at my previous deposition on MDL.
10:30:37 There were some positive samples on a chart that
10:30:40 were negative in the overall data, so I decided
10:30:43 to go through and make sure everything was
10:30:45 correct again.
10:30:47 **Q.** (By Mr. Chachkes) What about the other
10:30:48 typos, you found those or counsel?
10:30:52 MR. CIRSCH: To the extent -- I would not
10:30:53 have you reveal, Dr. Longo, anything that's work
10:30:56 product is protected under Rule 26. But if you
10:30:58 can answer aside from that, please do.
10:31:01 THE WITNESS: No, counsel did not
10:31:02 participate in helping to find typos.
10:31:04 **Q.** (By Mr. Chachkes) Okay. So you found
10:31:05 them personally?
10:31:06 **A. Personally and Dr. Rigler.**

(Defendants' Exhibits 8, 9, 10, and 11
10:31:08 were marked for identification.)
10:31:08 **Q.** (By Mr. Chachkes) Okay. And now
10:31:09 Exhibit 8, if you would look at that, if you could
10:31:12 confirm, is the January 31 quality control -- quality
10:31:19 assurance report that you created in this case?
10:31:22 **A. Yes, sir.**
10:31:22 **Q.** Okay. And then Exhibit 9, which is more
10:31:28 for the record than you because you can't confirm it,
10:31:30 it is a USB with the three reports in this case, the
10:31:36 November 1, the January 1, and the recent -- sorry.
10:31:42 Okay. So it is November, January, and the March 2018
10:31:46 report are all in full on Number 9. It's just too
10:31:50 much paper so we put it on the USB.
10:31:52 Can you confirm that Exhibit Number 10 is
10:31:59 a letter to you from J3 dated December 12, 2018,
10:32:04 about the MAS split of 21 historic talc samples by
10:32:13 XRD?
10:32:14 MR. CIRSCH: It's actually December 20.
MR. CHACHKES: What did I say?
10:32:20 MR. CIRSCH: December 12.
10:32:20 **Q.** (By Mr. Chachkes) I'm sorry. So it's
December --
MS. TROVATO: No, you're right. You're
right.

10:32:20 MR. CHACHKES: So which ones, then?
MS TROVATO: December 12 is 10.
10:32:22 **Q.** (By Mr. Chachkes) Okay. So December 12
10:32:23 is Exhibit 10; is that correct?
10:32:26 **A. Yes.**
10:32:28 **Q.** Okay. You should probably look at your
10:32:30 own copies, not mine.
10:32:31 **A. Did I get a copy?**
10:32:33 **Q.** Yes, you did.
10:32:34 **A. Okay. Sorry.**
10:32:35 **Yes, that's correct.**
10:32:36 **Q.** Okay. And Exhibit Number 11, we
10:32:40 premarked, is another letter from J3 dated
10:32:44 December 20 to you; correct?
10:32:46 **A. Correct.**
10:32:46 **Q.** All right.
10:32:52 MR. CIRSCH: I'm sorry again, but
10:32:55 Exhibit 10 I have says December 20 as well, so
10:32:57 maybe that's -- okay. I just got two of them.
10:33:00 Never mind.
10:33:04 **Q.** (By Mr. Chachkes) You received your
10:33:06 doctor's in philosophy in materials science and
10:33:08 engineering; correct?
10:33:10 **A. Yes.**
10:33:10 **Q.** You're not a geologist?

10:33:12 **A. I am not a geologist.**
10:33:13 **Q.** You're not a mineralogist?
10:33:15 **A. I did not take any courses in mineralogy.**
10:33:17 **Q.** Do you consider yourself an expert in
10:33:19 mineralogy?
10:33:20 **A. Usually that's up to the courts.**
10:33:22 **Certainly I believe I have more knowledge than the**
10:33:25 **average layperson, but I do not hold myself out with**
10:33:28 **any degrees in mineralogy.**
10:33:29 **Q.** Okay. You're not a certified industrial
10:33:31 hygienist?
10:33:31 **A. No, I'm not.**
10:33:33 **Q.** You've done exposure assessments, though;
correct?
10:33:37 **A. Yes.**
10:33:37 **Q.** All right. You're an expert in exposure
10:33:41 assessments?
10:33:42 **A. Again, I'm not sure what that means. I**
10:33:45 **certainly have done a number of studies in which we**
10:33:48 **have determined typical exposures from both**
10:33:52 **asbestos-added construction industrial products as**
10:33:56 **well as what I call hygiene exposure studies**
10:33:59 **involving Johnson & Johnson cosmetic talc samples.**
10:34:04 **Published on our exposure assessments in**
10:34:06 **the past. We use all standard protocols that are**

accepted by the community of scientists who do this type of work. Been qualified many times in court as an industrial hygienist specifically to asbestos.

So again, I have probably more knowledge than the average layperson on doing exposure assessment type studies involving asbestos.

Q. When a plaintiff has been exposed to multiple different talc-based products, each of which could possibly contain asbestos, is it best to analyze the asbestos content of each product?

MR. CIRSCH: Object to form.

THE WITNESS: I'm not sure it's required to analyze each product. You will have to clarify. Do you mean each different manufacturer or from different talc sources, such as the Italian or the Vermont or Montana?

Q. (By Mr. Chachkes) Let's say different manufacturers. Let's say a plaintiff has been exposed to talc-based products from three manufacturers. Is it best to analyze the asbestos content from each of the three manufacturers?

MR. CIRSCH: Object to form.

THE WITNESS: Certainly we try to do that; but if three manufacturers all have to use the talcum powder source is Italy, Italian, I think

you can imply that if one manufacturer's Italian talc has measurable levels or detectable levels of amphibole asbestos, then the other manufacturer more likely than not would have similar types of concentrations, depending on their processing flotation, et cetera.

If you have different manufacturers from completely different mines and you haven't analyzed anything from the particular talc mine, which has happened to me in the past, I typically say I don't have any opinions.

Q. (By Mr. Chachkes) Okay. If you're trying to determine which manufacturer's talc contributed what level of exposure to asbestos, do you need to analyze all the different manufacturers' products?

MR. CIRSCH: Object to form.

THE WITNESS: Again, it depends on who the manufacturer is. It's sort of an incomplete hypothetical.

Q. (By Mr. Chachkes) Okay. Let me complete it, then.

So hypothetically, if there's three manufacturers each from a different geological location, if you're trying to determine the exposure of a plaintiff, do you need to -- and what percentage

of the asbestos exposure came from which talc, would you need to analyze all three?

MR. CIRSCH: Object to form.

THE WITNESS: Again, that's an incomplete hypothetical. If we had never analyzed any manufacturer's source of talc from any particular location, then as I stated earlier, I would not have an opinion about that particular manufacturer.

If they come from things like, again, Vermont, Italy, say the Korean mines, then we have a pretty good understanding of the levels of amphibole asbestos that are typically found in the products from those mines.

Q. (By Mr. Chachkes) Okay. So you feel confidant that you can testify to the amount of amphiboles you expect in a bottle based solely on the geography from which the bottle comes?

MR. CIRSCH: Object to form.

THE WITNESS: I didn't say that.

Q. (By Mr. Chachkes) Okay.

A. **What I would say is we have analyzed a number of samples from other manufacturers, two different manufacturers, three different manufacturers, where, say, the source is Italy, so I**

know that there will be significant concentrations in some percentage of the samples.

Q. Okay. So let's say you have three bottles from three geographical locations that you haven't analyzed in the past. Do you need to analyze each bottle to determine the percentage of asbestos exposure per manufacturer?

MR. CIRSCH: Object to form.

THE WITNESS: When you say each bottle, I have five from each or two from each or ten from each?

Q. (By Mr. Chachkes) So does it matter?

A. **I don't know. I mean, it's a hypothetical. If we had not tested any samples from any particular geological location, I would not provide opinions on any -- the potential for amphibole asbestos, regulated amphibole asbestos to be in those containers.**

Q. Would you agree it's important to at least determine a plaintiff's exposure to asbestos on a comparative basis if there were multiple sources of exposure?

MR. CHACHKES: Object to form.

THE WITNESS: Depends on the information.

If the particular plaintiff says I use

manufacturer X, manufacturer Y, manufacturer Z, and I used them all 33.33 percent each and they all come from the same geological formation of where cosmetic talc is being used in those containers, then my opinion would be if it is a geological location that we have tested in the past, that they would all have similar -- that the manufacturers would have similar exposures.

If one of the manufacturers was, well, I've got a gift -- for example, if I got a gift bag once a year and I would use it and that's all, then I would say that the primary exposure is from the other manufacturers.

So it just depends on the circumstances.

Q. (By Mr. Chachkes) Okay. You're not a pathologist?

A. No, sir, I'm not.

Q. You have no medical training?

A. No, sir, I don't have any medical training.

Q. Are you a statistician?

A. I'm not a statistician.

Q. Are you a geostatistician?

A. I'm not that kind of statistician either.

Q. Okay. So in light of the reports that we

have in this case, are you here to testify in your capacity as a microscopist; is that accurate?

MR. CIRSCH: Object to form.

THE WITNESS: I'm here to testify on the qualifications I have and have been accepted in the past. I'm a material scientist; I'm an industrial hygienist; I have many expertise in the analysis of asbestos.

My testimony in the past has been that any particular types of manufacturers where we have analyzed the talc and we have analyzed the source -- know the source, that more likely than not there would have been a significant exposure based on the percentages of the samples that are positive. That's as far as I go.

Q. (By Mr. Chachkes) You've testified in the past the following: In my opinion, if you want to know if there's asbestos in talc, you would go to either our lab or Lee Poye's lab and that's it.

Do you recall that testimony?

MR. CIRSCH: Object to form. Do you have a copy of the testimony you can show the witness?

Q. (By Mr. Chachkes) Do you recall that testimony?

MR. CIRSCH: Object to form.

THE WITNESS: I don't recall the exact words, no.

Q. (By Mr. Chachkes) Okay. Do you agree that if you want to know whether there's asbestos in talc, you would go to either your lab or Lee Poye's lab and that's it?

MR. CIRSCH: Object to form.

THE WITNESS: It depends on the circumstances. If you're going to understand what's your best opportunity to see and get the appropriate detection limits, I'm only aware of Lee Poye and our lab that use routinely the heavy liquid density separation method.

There may be other labs out there doing it, but that's the only two I know at the moment.

Q. (By Mr. Chachkes) Okay. So you know of no other labs besides yours and Lee Poye that can accurately determine whether there's asbestos in talc, at least using the concentration method?

MR. CIRSCH: Object to form.

THE WITNESS: Accurately determine? It's all about getting the best analytical sensitivity. So analytical sensitivities and

using the non-heavy liquid density separation method for TEM is usually in the low to 10 to 12 million fibers per gram.

The heavy liquid density separation can reduce that; at least in our lab we have gotten as low as 3,000 fibers/bundles per gram. I know the R.J. Lee Group used the Blount heavy density liquid separation method once for TEM. There is an ISO protocol for it, so there may be other labs that I'm not aware of.

Q. (By Mr. Chachkes) So are you the only lab -- you and Lee Poye -- who can detect 3,000 structures per gram?

MR. CIRSCH: Object to form.

THE WITNESS: I don't know. Anybody following the heavy liquid density measurement technique should be able to achieve detection limits --

Q. (By Mr. Chachkes) Okay.

A. -- as such.

Q. So your opinion about the high qualifications of your lab and Lee Poye's lab, it's not based on different methodologies; it's just based on your opinion that you do it better?

MR. CIRSCH: Object to form.

THE WITNESS: Well, it's not really doing it better; it's just following the appropriate protocol for the analytical sensitivities. There may be other labs out there. John Fitzgerald's lab may be doing it now. I don't know.

Q. (By Mr. Chachkes) Okay.

A. **That's the only two I'm aware of that are routinely doing it now.**

Q. MAS has been testing talc for asbestos by TEM since 2017; is that correct?

MR. CIRSCH: Object to form.

THE WITNESS: We have been testing cosmetic talc since early 2017. We have tested industrial talc all the way back to the 1990s, early 2000s.

Q. (By Mr. Chachkes) MAS has been testing talc for asbestos by PLM since about October of 2018; is that correct?

MR. CIRSCH: Object to form.

THE WITNESS: I don't know when we got started testing industrial talc for PLM. Probably way back in the 1990s, early 2000s. We've recently started analyzing cosmetic talc using the ISO 22262-1 and the Blount PLM

method enhanced, not your typical analysis. I don't know when we got started last year.

Q. (By Mr. Chachkes) Okay. Is it possible you didn't start looking at cosmetic talc by PLM until October of 2018?

MR. CIRSCH: Object to form.

THE WITNESS: Well, unless I can go and look and verify, all I can say is I don't recall when we started analyzing cosmetic talc by PLM.

Q. (By Mr. Chachkes) Have any academic institutions endorsed MAS as one of the best labs in the world to test talc?

A. **If they have, they haven't let me know.**

Q. Has MAS received any accolades from any academic institutions for its talc testing?

A. **Not that I'm aware of.**

Q. Have any nationally or internationally renowned TEM scientists identified MAS as one of the best labs in the world for testing talc?

MR. CIRSCH: Object to form.

THE WITNESS: I don't know who these internationally recognized experts are. We're just following a standard protocol to analyze talc using the most appropriate sensitivities for analytical sensitivities.

Q. (By Mr. Chachkes) So you're not aware of any TEM scientists who's not taking plaintiff lawyers' money who has recognized MAS as one of the best labs in the world for testing talc?

MR. CIRSCH: Object to form.

THE WITNESS: I don't recall any TEM analyst being paid by plaintiffs' attorneys or any TEM analyst paid by defense attorneys that are calling me and saying good job, Bill.

Q. (By Mr. Chachkes) Have any nationally or internationally renowned PLM scientists identified MAS as one of the best labs in the world for testing talc?

MR. CIRSCH: Object to form.

THE WITNESS: I don't know who these internationally renowned PLM labs are. I do believe we're -- because of how we've enhanced the PLM method that we are one of the better labs because of the time and effort we put into the analysis. Sort of along the lines of the proposed PLM method by the FDA in 1973, I think they said it was laborious.

Q. (By Mr. Chachkes) All right. So this is not a question about what you believe or what people at MAS believe but a question about what third

parties believe.

Are there any nationally or internationally renowned PLM scientists or any scientists, for that matter, who have identified MAS as one of the best labs in the world for testing talc under PLM?

MR. CIRSCH: Object to form.

THE WITNESS: I don't know.

Q. (By Mr. Chachkes) Have you ever presented at any conferences about testing talc by TEM?

A. **Maybe. Not cosmetic talcs, no.**

Q. Okay. When you say maybe, nothing comes to mind?

A. **Well, we have been analyzing industrial talcs for some time. We have given talks at Johnson Conferences in the past; Mr. Hatfield has. Any of that data that may have happened, I just don't know.**

Q. Okay. But for conferences that relate to testing talc with TEM, sitting here today, you can't recall presenting at any such conference?

MR. CIRSCH: Object to form.

THE WITNESS: I don't recall.

Q. (By Mr. Chachkes) Have you ever presented at any conference -- sorry, strike that.

Have you ever been invited to present at

any conferences about testing talc with TEM or PLM?

A. Yes, I was.

Q. Okay. What was that?

A. Bruce Bishop invited me to come debate Dr. Sanchez at a DRI conference last year.

Q. Okay. So did you actually go to that conference?

A. No.

Q. And DRI conference, that's a defense bar conference?

A. Yes, sir. I have participated in those for a number of times and typically debating one of the defense experts. And he sent an email, and I couldn't arrange it in my schedule.

Q. The FDA had a conference in November '18 with Jeff San at the University of Maryland; are you aware of that?

A. I am.

Q. Were you invited to participate?

A. No.

Q. Are you familiar with Forensic Analytical Labs?

A. I am.

Q. Would you agree that they are an independent laboratory?

MR. CIRSCH: Object to form.

THE WITNESS: I don't know what their background is.

Q. (By Mr. Chachkes) Okay. Have you relied on their testing of talc for asbestos before?

A. I don't know.

Q. Sitting here today, is there any reason why you believe you shouldn't be able to rely on their work?

MR. CIRSCH: Object to form.

THE WITNESS: It depends on the work. I would have to review what work that hypothetically you want me to rely on.

Q. (By Mr. Chachkes) Yeah. So I'm just talking about the laboratory, not necessarily the nature of the science, which of course you'll always review; right?

So the nature of the laboratory -- and sitting here today, is there anything about the Forensic Analytical Labs laboratory that makes you suspicious of their work in any way?

A. I don't have an opinion one way or the other. Typically, for me to say something about any particular lab, I would have to have some interaction with that lab over the years.

Q. Now, you issued a supplemental report January 15, 2019; correct?

A. Yes, sir.

Q. Why? What did it add to or subtract from the first report?

A. There was typos in the first report. Also, we talked -- added somewhere, I believe, the Blount PLM that we did on the -- or talked about it on the 16 containers that Lee Poye tested.

Q. And those errors that you just referred to, when did you identify them? Was it after you issued your January 15 report -- I'm sorry, after you issued your November 14 report?

A. Yes.

Q. And how did you identify those errors?

A. Reading through it. It was very obvious to me that J3 was not P3, that I had missed it in a couple of places.

Q. Okay. So the errors that were identified and fixed in the January 15 report, they were all identified by you personally?

A. Either myself or Dr. Rigler. I can't tell you which one of us fixed the most.

Q. Okay. And referring to these additional data in the January 15 report, did that testing occur

after November 14, 2018?

A. Yes. I believe so.

Q. And then there's a second supplemental report dated February 1, 2019; correct?

A. Correct.

Q. Okay. And we discussed that before, didn't we?

A. Yes, sir.

Q. Do you know why it was not produced until February 2?

MR. CIRSCH: Object to form.

THE WITNESS: Why it wasn't produced until February 2?

Q. (By Mr. Chachkes) Yeah.

A. Because that's when I sent it.

Q. Okay. You also produced two reports from Lee Poye at J3 Resources dated December 12 and December 21; correct?

A. Correct.

Q. Can you describe what those reports are?

A. XRD of 17 MDL samples -- excuse me -- 19 MDL samples to finish off the MDL samples for XRD that we were going to test. We didn't test the Windsor railroad car samples for XRD.

Q. And there's some PLM work in there as

10:51:35 well?
10:51:37 **A. I don't know.**
10:51:39 Q. That's okay. We can get back to that.
10:51:40 Do these samples in Lee Poye's
10:51:47 supplemental reports relate to -- do they correspond
10:51:53 to samples in your report?
10:51:54 **A. Yes.**
10:51:54 Q. How did they -- how can somebody correlate
10:51:58 the two?
10:51:59 **A. Let me see. There should have been a --**
10:52:12 **let me get some of this stuff out of the way.**
10:52:15 Q. Actually, you know, let's -- here. Let's
10:52:17 go back to 10.
10:52:20 Exhibit 10 is the December 12 letter
10:52:23 from -- this is mine. You've got one in your stack.
10:52:25 **A. Oh, do I?**
10:52:26 Q. Yes.
10:52:27 **A. Okay.**
10:52:32 Q. Just the coding system, let's just take
10:52:34 the first one. M69722-001, do you see on the front
10:52:40 page?
10:52:40 **A. Yes.**
10:52:40 Q. Do you know what that refers to? Does
10:52:42 that coding indicate something to you?
10:52:44 **A. It does. I didn't -- we don't have the**

10:52:48 **key.**
10:52:48 **What I do is I make an additional number**
10:52:52 **so that the -- Lee Poye essentially gets blind**
10:52:58 **samples, and there's supposed to be a key produced**
10:53:00 **with that.**
10:53:01 Q. Okay. You have a key?
10:53:02 **A. I don't have it with me. I thought it was**
10:53:04 **attached to the report.**
10:53:05 MR. CHACHKES: We ask the plaintiffs to
10:53:08 produce that key. I don't think we got it.
10:53:11 MS. O'DELL: Okay.
10:53:15 Q. (By Mr. Chachkes) Okay. So have you
10:53:19 produced all the J3 -- all the data J3 Resources
10:53:24 generated from the work for you in this case?
10:53:27 **A. Yes.**
10:53:27 Q. And did you ask them about what kind of
10:53:31 materials they generated?
10:53:33 **A. I mean, other than what they sent me, no.**
10:53:38 Q. Okay. So you didn't ask them whether
10:53:39 there was additional material that they generated but
10:53:42 just did not provide to you?
10:53:44 **A. No, sir. I have dealt with and had XRD**
10:53:48 **done by them before in other reports, and this is**
10:53:51 **what they provide.**
10:53:52 Q. Has anyone at MAS discussed the production

10:53:56 request in this case with anybody at J3 Resources?
10:53:59 **A. No.**
10:53:59 Q. What measures do you employ to ensure that
10:54:02 J3 Resources provides all the data it generated in
10:54:06 its work for you?
10:54:07 MR. CIRSCH: Object to form.
10:54:08 Q. (By Mr. Chachkes) Actually, strike that.
10:54:09 I think we have already done that.
10:54:10 All right. Your lab produced something
10:54:11 called global particles tables for a number of
10:54:15 samples. Does that ring a bell?
10:54:16 **A. Yes.**
10:54:16 Q. Okay. And what are those?
10:54:21 **A. That's the raw data for each of the**
10:54:24 **particles that were measured and counted.**
10:54:26 Q. Okay. And so that's the data underlying
10:54:30 what you report in your expert reports?
10:54:33 MR. CIRSCH: Object to form.
10:54:34 THE WITNESS: Not in this expert report,
10:54:35 I'm not relying on it, but in past ones, yes.
10:54:37 Q. (By Mr. Chachkes) Okay. Because those
10:54:38 are non-MDL samples?
10:54:41 **A. Well, they're non-MDL samples. It's not**
10:54:44 **so much they're non-MDL samples, but I was under the**
10:54:48 **impression that these MDL samples weren't contested**

10:54:51 **for chain of custody.**
10:54:52 Q. Okay. But what I'm asking, though, is the
10:54:55 global particle tables that you produced in this case
10:54:58 do not correspond to MDL samples; is that correct?
10:55:03 **A. That is correct.**
10:55:04 Q. Okay. Are you able to generate a global
10:55:07 particle table for the MDL samples?
10:55:10 **A. We have not analyzed any MDL samples yet**
10:55:13 **that I'm aware of.**
10:55:13 Q. What about the samples in your reports in
10:55:16 this case?
10:55:16 **A. Well, they're not particle size analysis.**
10:55:20 **They're PLM and TEM analysis. Those are specifically**
10:55:25 **designed for detection of amphibole asbestos, not**
10:55:31 **particle sizing.**
10:55:32 Q. Why did you produce the global particle
10:55:34 tables in this case?
10:55:35 MR. CIRSCH: Object to form.
10:55:36 THE WITNESS: I was asked for it, you
10:55:39 know, in other cases, so I thought I would just
10:55:41 produce it here, even though I'm not relying on
10:55:43 it.
10:55:46 Q. (By Mr. Chachkes) Okay. Do you do talc
10:55:52 particle size analysis for the MDL?
10:55:54 **A. We did not.**

10:55:55 **Q.** All right. But the data in the global
10:56:07 particle tables relates to talc particle size?
10:56:12 **A. Yes, sir. All the particles for the talc**
10:56:15 **sizes that -- in the -- I guess it was in August 4,**
10:56:22 **2017, or 2018 report, I can't remember.**
10:56:24 **Q.** Sitting here today, are you aware of any
10:56:27 relevance that the global particle tables that you
10:56:30 produced have to the reports you issued in this case,
10:56:33 the MDL?
10:56:35 MR. CIRSCH: Object to form.
10:56:36 THE WITNESS: Again, as I'm stating, I'm
10:56:38 not relying on it. We did not do any MDL
10:56:40 particle sizing. May in the future, but we
10:56:44 haven't done it here, and I'm not relying on the
10:56:46 report that we issued --
10:56:47 **Q.** (By Mr. Chachkes) Okay.
10:56:49 **A. -- in August.**
10:56:50 **Q.** Did your analyst compare any of the
10:56:52 particles identified in your MDL report by PLM to
10:56:59 compare them with a known asbestos reference sample?
10:57:03 MR. CIRSCH: Object to form.
10:57:14 THE WITNESS: I don't know. It's not
10:57:16 something that we typically require analysts to
10:57:19 do, especially the analyst doing this. He's
10:57:23 worked for us for almost 30 years; he's a

10:57:26 professional geologist; he's probably analyzed
10:57:30 tens and tens and tens of thousands of samples.
10:57:33 He does compare to the appropriate
10:57:38 information --
10:57:43 MR. CIRSCH: Let him finish.
10:57:45 **Q.** (By Mr. Chachkes) Yeah.
10:57:46 **A. So did he pull out standard anthophyllite**
10:57:47 **tremolite? I would have to check.**
10:57:48 **Q.** So when you say compared to the
10:57:50 appropriate information, you have no knowledge of
10:57:52 what that appropriate information is, do you?
10:57:54 **A. Sure I do.**
10:57:54 MR. CIRSCH: Object to form.
10:57:56 THE WITNESS: The refractive indices, the
10:58:01 measurement of -- indices, the angle of
10:58:02 extinction, either oblique or parallel, depend
10:58:05 on cross polars, the dispersion staining on the
10:58:08 colors using the Su charts to determine the
refractive indices, the sign of elongation, or
10:58:13 the speed.
10:58:13 **Q.** (By Mr. Chachkes) So all these --
10:58:14 **A. All the standard mineralogical information**
10:58:16 **that a well-seasoned PLM analyst would do.**
10:58:20 **Q.** So I'm not talking about the data that he
10:58:23 pulls from looking at samples. I'm talking about

10:58:26 comparing to a reference sample from some source
10:58:30 other than something generated by MAS, are you aware
10:58:33 of any of that?
10:58:34 MR. CIRSCH: Object to form.
10:58:36 THE WITNESS: They have all the references
10:58:38 for all the NIST standards that are routinely
10:58:41 looked at when we get -- when our lab is audited
10:58:47 by the NVLAP, they go around and make sure the
10:58:51 analysts can identify these types of materials.
10:58:53 So, yes, we have reference materials. You
10:58:56 know, did they pull it out or not, as I'm
10:58:59 sitting right here specifically, but they do do
10:59:01 that periodically. So that's all I can tell
10:59:05 you.
10:59:05 **Q.** (By Mr. Chachkes) Okay. So you have NIST
10:59:07 samples, but you don't know whether your PLM
10:59:09 scientist actually compared the PLM work he did in
10:59:13 this case to those NIST samples for this case?
10:59:18 **A. Specifically for these MDL samples did he**
10:59:23 **pull out the standards or just use the standard**
10:59:27 **crystallographic information that's specific for the**
10:59:31 **identification of these types of amphiboles, I'd have**
10:59:35 **to check.**
10:59:36 **Q.** Okay. So I was asking about the NIST
10:59:38 standard, and you threw in something else. I just

10:59:41 want to focus on the NIST standard.
10:59:43 Sitting here today you're not aware that
10:59:44 your PLM scientist compared his results on the PLM
10:59:47 for the samples in this case directly to the NIST
10:59:52 sample -- NIST standards; correct?
10:59:55 MR. CIRSCH: Object to form.
10:59:56 THE WITNESS: It's not being aware or not
10:59:57 aware. It's just a question that I can clear up
11:00:01 and ask.
11:00:02 **Q.** (By Mr. Chachkes) Okay. Did you ask him
11:00:05 at any point?
11:00:07 **A. No. I typically don't ask 30-year**
11:00:12 **seasoned analysts/geologists on any particular**
11:00:15 **project. But now that you've asked the question,**
11:00:18 **I'll ask.**
11:00:18 **Q.** Okay. And so you have one analyst doing
11:00:24 all your PLM work for the MDL samples?
11:00:25 **A. Yes.**
11:00:26 **Q.** What's his name or her name?
11:00:27 **A. Paul Hess.**
11:00:29 **Q.** Spell the last name, please.
11:00:31 **A. H-e-s-s.**
11:00:32 **Q.** Your report doesn't state that there were
11:00:38 asbestos reference samples used in the PLM analysis;
correct?

A. No, sir. It's not the type of information I would typically put in a report.

Q. Do you know which set of NIST standards exist at MAS right now?

A. It is the 1875, I think it is. I have to check the numbers on it. It's the standard NIST samples that all asbestos labs have or should have.

Q. Do you know when you obtained them?

A. Not as I sit here today.

Q. Did your analyst compare any of the particles identified in this report by TEM with any known asbestos reference samples?

A. Well, we have analyzed both reference tremolite series, anthophyllite series. We have all those reference standards, analytical data on the TEM walls. I don't think they pulled the reference and put them in each and every time, but they routinely check reference samples.

Q. Okay. So when you say they check reference samples, are you saying you mean that they check to whatever's on your reference wall?

MR. CIRSCH: Object to form.

THE WITNESS: Well, no. The reference wall is from the reference samples, and we have analyzed reference samples in the past

specifically for these J&J cases. And the analysts are well trained.

I don't know how often they need to pull out a reference sample in order to identify either the anthophyllite solid solution series or the tremolite solid solution series.

Q. (By Mr. Chachkes) Let's ask two different lines of questions here.

So you have internal MAS-generated reference samples for TEM to identify asbestos; is that correct?

A. Yes.

Q. Okay. Did you produce them?

MR. CIRSCH: Object to form.

THE WITNESS: I didn't think it was asked.

MR. CHACHKES: Okay. I would ask the plaintiffs produce that, please.

Q. (By Mr. Chachkes) What about reference samples generated by third parties, do you have those?

A. Reference samples by third parties, you will have to -- NIST is a third party.

Q. Okay. So anything else?

A. We have accumulated reference samples now from anthophyllite asbestos from Windsor County, and

I'd have to look at them and see what the validation is. We have cummingtonite standards now. We have grunerite standards. We have -- I believe we have winchite and richterite standards. We have not analyzed them yet to the degree where we can put the results altogether.

Q. So are these -- so I'm talking about reference standards that you can look at those and compare to what you're generating in this case. So you're saying that there are third-party anthophyllite standards that you have that were produced by something in Windsor County?

MR. CIRSCH: Object to form.

THE WITNESS: It wasn't produced by Windsor County. It was a mineral house that sells them. And I have not had an opportunity to -- we haven't had an opportunity to look at them yet.

Q. (By Mr. Chachkes) That's just the mineral, though, right, the raw mineral?

MR. CIRSCH: Object to form.

THE WITNESS: Well, it's fibrous, it's raw mineral anthophyllite, raw mineral cummingtonite, raw mineral grunerite, raw mineral winchite-richterite.

Q. (By Mr. Chachkes) Okay. For those minerals that you just mentioned, did you obtain from a third party a TEM photo of the mineral at issue that you can use as a standard to compare what you find under your TEM?

MR. CIRSCH: Object to form.

THE WITNESS: No. Typically people don't provide that -- or NIST should have -- a TEM lab that's looking at standards should have the qualifications and training to be able to recognize the regulated asbestos types.

Q. (By Mr. Chachkes) Okay. So, now, the only third-party TEM photographs that you could use as a standard for determining whether what you're looking at under your TEM is asbestos, the only one you've mentioned so far is NIST; correct?

A. I'm sorry, I misunderstood.

NIST does not provide you TEM pictures or EDS pictures or PLM pictures or any XRD pictures. They assume you have the training and capability of doing that.

I'm not aware of any third-party group providing photograph standards along with the samples.

Q. Okay. So to sum it all up, you do not

have any third-party TEM photos that you use as standards to compare to what you're seeing under the TEM?

MR. CIRSCH: Object to form.

THE WITNESS: That's correct. No third party has sent us TEMs along with their standards and say here's a standard with a TEM photo and this is what it all looks like.

Q. (By Mr. Chachkes) Your report also does not state that the analyst used asbestos reference standards in their TEM analysis; correct?

A. **That is correct. None of our reports do.**

Q. How does your lab distribute samples to individual analysts to test? Is it random? Is it like some analysts get a certain kind of sample?

A. **It's random.**

Q. Is that the same for J3? Did you give them random samples?

MR. CIRSCH: Object to form.

THE WITNESS: Random samples. For J3 I specifically gave them the samples that we wanted XRD done on them.

Q. (By Mr. Chachkes) Okay. But for your individual analyst, nobody's getting like more Vermont and someone's getting more China, that kind

of thing?

A. **Not that I'm aware of.**

Q. You didn't give any particular analyst like you're getting more bottles from the '50s and '60s and someone else is getting something more from a later era, that's not happening?

A. **It's fairly random. The analysts don't have any knowledge of anything more than the sample number. They don't know if it's China or Vermont or -- we're not telling them anything other than they just get a sample number.**

Q. Who decides which analyst gets which bottles?

A. **That's a good question. I guess Victoria Panariello does.**

Q. Who is she?

A. **She is the head person in our TEM lab.**

Q. Head person meaning administrative? Scientist?

A. **She's a scientist.**

Q. Does she do any analysis herself?

A. **Occasionally.**

Q. Under what instrument?

A. **She's -- she can do both polarized light microscopy as well as transmission electron**

microscopy.

Q. Would you expect two analysts from your laboratory, given splits from the same bottle, to identify the same asbestos concentration?

A. **You'll never get an exact asbestos concentration depending on what level of accessory amphibole asbestos is in the sample, but I would not expect the exact same.**

Q. What level of variation would you think is so great that you would conclude something went wrong?

A. **Don't know. I've not seen that variation yet for two different samples of the same bottle that's been analyzed.**

Q. Okay. Hypothetically, if you split a bottle and one analyst found no detectable asbestos and another found half a percent by concentration asbestos, would you think that was within a reasonable margin of error?

MR. CIRSCH: Object to form.

THE WITNESS: By TEM?

Q. (By Mr. Chachkes) Sure, by TEM.

A. **At a half a percent?**

Q. Yeah.

A. **No, that's not acceptable.**

Q. Okay. What about one analyst finding no detectable asbestos, another finding a quarter of a percent?

MR. CIRSCH: Object to form.

Q. (By Mr. Chachkes) Is that an acceptable margin of error?

A. **.25 percent by weight? A quarter percent?**

Q. No, no. A quarter of a percent.

MR. CIRSCH: Object to form.

THE WITNESS: Isn't that .25? Isn't that a quarter of a percent?

Q. (By Mr. Chachkes) Yeah.

A. **Sometimes simple math gets the better of me.**

I would think that would be unacceptable; something has gone wrong.

Q. Just to spare me from the trouble of doing this all day, at what point would you say, you know, that's acceptable, and maybe a little larger wouldn't be acceptable?

MR. CIRSCH: Object to form.

THE WITNESS: I'd have to look at every situation to see what that percentage is before I could say what is acceptable and not acceptable.

11:09:35 **Q.** (By Mr. Chachkes) Okay. You have no written or decided standard in your laboratory for what kind of error between two analysts is acceptable or not acceptable, do you?

MR. CIRSCH: Object to form.

THE WITNESS: Yeah, we do. We have measured where they have gone in and analyzed the same sample. See, when you were asking for what's acceptable and not acceptable, it's not so much on the analyst's side. It could be the preparation side. It could be a number of things.

So we have done error rates for the analyst by TEM analysis where they go in and we know that in these many grid openings there's this many fibers, and then we can have them analyze the same grid openings.

You're taking out the part about the sample preparation, the filter preparation. So you have to look at it individually. But for error rates for the analyst, we have that.

Q. (By Mr. Chachkes) Okay. But just comparing -- just visually comparing a grid, a single grid; correct?

MR. CIRSCH: Object to form.

THE WITNESS: Grid openings --

Q. (By Mr. Chachkes) Yeah.

A. -- where each analyst is told to count the same grid opening and, therefore, you can determine what the analyst -- what the coefficient of variation is.

If you have a sample where -- you take two samples and one sample is -- they found one fiber in a hundred grid openings and another sample they found zero, that's within the -- that's within the margin of error. That's acceptable.

If you have a sample where one analyst found 50 fibers and one analyst found none or one, then something has happened, and you have to go back and look and go, okay, are the grid openings you looked at he looked at in the first one. So there is a process that we have to evaluate all data where we have multiple samples of the same container.

Q. Sample preparation is extremely important because that affects the --

(Cell phone rings.)

Q. (By Mr. Chachkes) Okay. Sample preparation is extremely important because that affects the outcomes; correct?

MR. CIRSCH: Object to form.

THE WITNESS: All sample preparation is important.

Q. (By Mr. Chachkes) And do all your analysts use the same sample preparation methods?

A. All the people who -- the folks who prepare the samples use the method that is appropriate for the analysis that's going to be done.

Q. If there is -- for all the samples that were analyzed in your report, were they prepared -- the sample preparation, were they all done by the same method?

A. Yes.

Q. Were they all done by the same person?

A. I would have to look. But yes. Most likely these samples were all done by the same person.

Q. Okay. If you took a split from a single bottle and you had two analysts look at it, would you expect them to identify the same kinds of asbestos, assuming there was asbestos spotted?

MR. CIRSCH: Object to form.

THE WITNESS: Not necessarily, no.

Q. (By Mr. Chachkes) Okay. So one could say I see tremolite and another could say I see anthophyllite and you don't think that is -- that

demonstrates a problem?

MR. CIRSCH: Object to form.

THE WITNESS: If the chemistry is right, the -- and they have identified it correctly, no. Many of these samples have two types of asbestos in it.

Q. (By Mr. Chachkes) Okay. Is there any situation where you think an analyst has identified an asbestos that you believe maybe there's an error there?

MR. CIRSCH: Object to form.

THE WITNESS: I haven't run across anything like that, no.

Q. (By Mr. Chachkes) And if one -- if there was a split and one analyst said I found -- let's say there was a split three ways, and one of your analysts said I found anthophyllite, another analyst said I found tremolite, and a third analyst said I found nothing detectable, you would not say maybe there's a problem here?

MR. CIRSCH: Object to form.

THE WITNESS: Unless I could review the data and -- you know, it's an interesting hypothetical. I don't think we have run across that interesting hypothetical.

But I would have to review the data to see what they're analyzing, what the chemistry is, how did they identify, and how many asbestos fibers the two that found it versus the one that didn't. So it's --

Q. (By Mr. Chachkes) Okay.

A. -- you just can't say is this a problem, this -- maybe, maybe not.

Q. Okay. So there is a situation you would say there is not a problem where three analysts looking at the same bottle finding -- one found anthophyllite, one found tremolite, one found nothing detectable, there is a situation where that would not be a problem, you can imagine that?

MR. CIRSCH: Object to form.

THE WITNESS: I don't know if I can imagine any of this happening, but it's your hypothetical. Unless I can look at the data and understand what each of the analysts were counting, how many structures, what is the chemistry, what is the diffraction patterns, is it the two analysts found one and one found zero, is this -- you know, what is the mine this is coming from, how does our other data look -- there's a lot involved there than just saying

off the cuff, oh, that's a problem or that's not a problem.

Q. (By Mr. Chachkes) Okay. All right. I've asked you whether you can imagine a situation where that's not a problem. You have not provided that to me. This is -- I'll just ask it one more time. Can you provide that to me? I can imagine that's not a problem.

MR. CIRSCH: Object to form. I think he answered your question.

THE WITNESS: I can't give you any additional information about that because I don't -- as a scientist I just don't like to say, well, this is -- I can imagine a problem here, I can't imagine it's a problem, without looking at any data to see how many asbestos fibers each of the analysts counted, is it one, is it ten, is it five, what's the chemistry look like, the EDXA, the SAED. I would have to review it to see if it's a problem or not.

Q. (By Mr. Chachkes) Is there sufficient subjectivity in the system such that it could be correct that one analyst could find in a bottle tremolite and another analyst could find in the bottle anthophyllite?

MR. CIRSCH: Object to form.

THE WITNESS: I don't think it's subjectivity. I just think it's wherever the cosmetic talc source was in any particular mine, what's there. We have many samples that have both types of asbestos in it.

So you can't say, well, you found this and the other one found that, when the source, the accessory -- amphibole asbestos accessory mineral in these mines have both types.

Q. (By Mr. Chachkes) If one of your scientists looked at a J&J bottle of talc and found a particular concentration of a particular kind of asbestos, would you -- do you believe to within a scientific -- a degree of scientific -- reasonable scientific degree of certainty that a second scientist following proper procedures would find the same?

MR. CIRSCH: Object to form.

THE WITNESS: I think we already talked about this. I would never expect a second scientist or a second analyst going in with a separate prep sample finding the exact amount. And again, it depends on how many is there.

We did discuss this once. If it's one or

two and the second analyst found none, that's in the margin of error, or it's looking for the needle in the haystack sort of analogy.

If one analyst found 50 and the other found zero, yes, that's a problem, like we already discussed. Again, I would have to look at the data to determine if it's a problem or not.

Q. (By Mr. Chachkes) Do you believe it's appropriate, given this margin of error, to run multiple tests on a single bottle and then average the results to get what would be the correct answer?

MR. CIRSCH: Object to form.

THE WITNESS: I don't think that's necessary. I think the -- we can accept what the analysis is. It comes from a sample in a bottle. The more you run, you may go from nondetect initially to detect in the second or third. But I don't think that is necessary to do for the types of analysis we're doing.

Q. (By Mr. Chachkes) For two of your analysts analyzing the same bottle, what degree of difference in the detected percentage of fibers versus detected percentage of bundles would you expect normally?

MR. CIRSCH: Object to form.

THE WITNESS: I don't have any expectations. The analyst is ultimately making the decision if it is a single fiber or a bundle. Because he's looking in the microscope, he's the one who can -- you're looking through the fiber, he's the one doing the -- he can change the focal plane, he can change from dark field to bright field, so ultimately he's making the decision on it.

Q. (By Mr. Chachkes) I am asking really what is the margin of error in detecting fiber versus bundle percentage, acceptable margin of error. Have you ever figured that out?

A. We haven't done that; it's really not necessary. It's more important for coefficients of variation. I've reviewed all the photographs of fibers and bundles. I would say 95, 98 percent of them I agree with. There's a couple percent in there that you have to leave it up to the analyst to make that decision.

Q. Would you expect an analyst in your lab and an analyst in Lee Poye's lab to get the same results for a particular bottle? Is it the same answer as I've been getting with two analysts in your

lab?

MR. CIRSCH: Object to form.

THE WITNESS: Yes. I would expect, depending on what the count is or how many fibers, if it's not in the margin of error, that we would verify that it's same bottle as positive. But other than that, I would have to see the data to see.

Q. (By Mr. Chachkes) When you say -- when you say it's not within the margin of error, what's the quantification of that margin of error?

A. I think our analysts have a margin of error on coefficient of variation somewhere in the 6 to 7 percent range. So one lab finding one fiber or maybe two fibers, another lab finding zero or finding four, I don't have any issue with that.

Q. Would you expect the samples, the various bottles from a single mine, like all the bottles from J&J talc from Vermont, cosmetic talc from the Vermont mine, to have roughly the same EDS spectra?

MR. CIRSCH: Object to form.

THE WITNESS: Depending on the type of asbestos, yes.

Q. (By Mr. Chachkes) Okay. By the way, I've seen EDXA; I've seen EDS. Do you use those

synonymously in your report?

A. I think all ours say EDXA. EDS is old school. They're both the same technique: energy dispersive spectroscopy or energy dispersive x-ray spectroscopy.

Q. Do you expect all the samples from a single mine, for example, the cosmetic talc from J&J's Vermont mine, to have similar SAED patterns?

A. Depending on the orientation of the crystal and depending on what the material is.

Tremolite, winchite, richterite, actinolite typically have similar, but the anthophyllite solid solution series, especially from Vermont where you can have no iron, iron-rich, cummingtonite, high-iron cummingtonite, and actually going to grunerite, those will have different reflections because you're going from orthorhombic to monoclinic.

Q. So would you expect all the samples from a single mine to have the same concentration of asbestos?

A. No.

Q. Why not?

A. Because you're dealing with accessory minerals. It just depends on where it's being dug

out of the mine.

Q. Would you expect all the samples from a single mine to have the same fiber versus bundle ratio?

A. Not necessarily. All these materials are milled, and you're dealing with an asbestos type tremolite-anthophyllite that's brittle. So I don't know if I would expect to see the same bundles to fibers.

And of course you're also dealing with the microscopist who has to make that final decision, the TEM microscopist, if it's a single fiber or bundle.

What we try to make sure happens is that every asbestos fiber or bundle we identify meets the counting criteria for a regulated asbestos fiber or bundle as per the TEM methods, both ISO, ASTM. That's the most important thing.

And then we try to also get some consistency on whether it's bundles or fibers. But that's what we strive for, is following the protocol, following the standard counting rules, and identification.

Q. Hypothetically, if one of your researchers analyzed 150 different samples from a single mine and another researcher analyzed those same 150 samples,

would you expect the averages for both the researchers to be the same?

MR. CIRSCH: Object to form.

THE WITNESS: I don't know. I'd have to -- I mean, again, you have to look at the data and determine what that percentage is for those exact same samples and what they found versus the other.

I wouldn't be surprised if they're in the range of an average or in the range of high to low. If it's not in that range, then I would have to look at it to see if it's a problem or not.

Can we go off the record for a second?

MR. CIRSCH: Sure.

(Recess from 11:24 a.m. to 11:39 a.m.)

Q. (By Mr. Chachkes) Dr. Longo, there are bottles of J&J talc, cosmetic talc, where you've not detected asbestos; correct?

A. That's correct.

Q. So for example, there are some bottles of Vermont sourced J&J talc where you've not detected asbestos; correct?

A. That is correct. The better way to say that is the asbestos, if present, is below our

detection limit.

Q. Okay. Do you have any opinion as to whether, if one of those bottles were retested, whether you would get the same result?

MR. CIRSCH: Object to form.

THE WITNESS: And again, this is -- the same result is either zero or nondetect below our detection limit or possibly one right at the detection limit, and I think we've had samples like that before.

I think I can think of either Krystal Kim's two samples and Joanne Anderson's two samples, I believe one was positive and one was negative, but they were two different bottles.

Where we have tested the two samples from the same bottle would be the 1978 historical, and we found them in both.

Q. (By Mr. Chachkes) Okay. I'm not asking about specific bottles. So listen to the question I'm asking.

If you had a nondetect on a bottle of J&J cosmetic talc for asbestos, would you expect, generally speaking, that if you ran the same test again, you would get the same result, the non-deduct?

MR. CIRSCH: Object to form.

THE WITNESS: I don't have any expectations one way or the other, and I think we've gone over this. This is the hypothetical if we analyzed it again, are we going to find the same thing. It depends on, again, how many asbestos fibers or bundles were detected the first time.

If we detect one or two the first time and do it again and it's zero, that's within the error rate that you would expect. Or if we tested again and we find that it's even more, say three fibers or four fibers.

So you have to look at specifically on what the first test is, and we're assuming the first test now is a nondetect, below our detection limit. And if the second test shows that there is one or two regulated asbestos fibers, that wouldn't surprise me.

Q. (By Mr. Chachkes) Okay. So let me ask the question again because you really answered a different question.

The question is, if you had a bottle of J&J talc where you had a nondetect. I'm not asking what your experience is. I'm not asking about a specific bottle. I'm asking just generally speaking,

would you expect to have another nondetect if you were to test it again -- nondetect in the first instance?

MR. CIRSCH: Object to form.

THE WITNESS: I don't have an expectation one way or the other. The results are what they are.

Q. (By Mr. Chachkes) Can you make any assumptions about a bottle of J&J cosmetic talc from Vermont about the asbestos content without analyzing the bottle?

A. I don't believe you can predict just how much asbestos is in any particular bottle without analyzing it.

Q. What about the possibility that there's no asbestos, can you -- if you haven't analyzed a bottle of J&J talc sourced from Vermont, is it possible that there's no detectable asbestos?

MR. CIRSCH: Object to form.

THE WITNESS: Again, I don't have expectations one way or the other. It's either going to be above, at, or below our detection limit, depending on the amount of regulated asbestos that's in that bottle.

Q. (By Mr. Chachkes) You're not assuming

that a nondetect of a J&J bottle of cosmetic talc is an incorrect result; correct?

A. I'm sorry, could you repeat that?

Q. Yeah, I didn't do you a favor there, did I?

You don't believe that a nondetect for asbestos on a J&J bottle of cosmetic talc means you've made an error?

MR. CIRSCH: Object to form.

THE WITNESS: No. It only means that if there is regulated asbestos present in that bottle, it's below our analytical detection limit.

Q. (By Mr. Chachkes) Your report includes EDXA spectra for several particles; correct?

A. For --

MR. CIRSCH: Object to form.

THE WITNESS: For several regulated asbestos fibers and bundles, yes.

Q. (By Mr. Chachkes) Describe how your analysts calibrate your EDXA system.

A. It's calibrated in the QA/QC, I believe, every couple of months where a standard is run and then they make a determination on its count rates. So whatever we have to do for the National Voluntary

Laboratory Accreditation Program.

Q. Do you keep that data and results on your QA/QC?

A. Yes.

Q. Have you ever produced it?

A. No.

Q. How often do they calibrate -- strike that.

Do your analysts compare their EDXA spectra to known reference samples, known reference spectra?

A. Yes.

Q. And are those spectra from outside MAS or generated within MAS?

MR. CIRSCH: Object to form.

THE WITNESS: The reference spectras have been generated by MAS.

Q. (By Mr. Chachkes) And do your analysts compare their EDXA spectra to any third-party reference spectra?

A. Possibly. I mean, there's plenty of publications or book chapters in the past on things like tremolite, richterite, winchite. Not so much on richterite and winchite because it's a mineral that nobody seems to have. We believe we have some now,

but we'll have to check it just to determine the sodium concentrations versus the potassium concentrations.

Q. Okay. So sitting here today, you don't know whether your analysts compare their EDXA spectra to third-party standards?

A. No, I didn't say that.

MR. CIRSCH: Object to form.

THE WITNESS: We have our own standards, we have the NIST standards. And quite frankly, a TEM analyst identifying tremolite and anthophyllite or iron-rich anthophyllite is almost elementary compared to for people with analysts with a lot of experience. We have the references.

If you have any particular issue with any particular EDXA spectra that you think has been misidentified as one of the regulatory asbestos types in these reports, I would be happy to look at it and we can discuss it.

Q. (By Mr. Chachkes) I would like you to listen carefully to the question.

The question is: For the EDXA spectra in your report, the conclusions made about which mineral that is based on the EDX -- which crystal that is

based on the EDXA spectra, was that done comparing the spectra to a third-party standard?

MR. CIRSCH: Object to form.

THE WITNESS: Are you asking a third-party standard spectra or a third-party standard mineral like NIST?

Q. (By Mr. Chachkes) Okay. How about a third-party standard, any third-party standard, somebody else other than your lab generated this spectra, you used that as a standard?

A. I don't know if we've looked at any other third-party spectra other than what has been -- I think Jim Millette has published in the past. I know we have his stuff. I believe McCrone has also. I have to look in the particle analysis if they've done that. But typically we rely on the actual minerals and the spectras that we've generated in the past from the standards.

Q. So the question isn't about whether third-party standards exist. I'm talking about the functional day-to-day your analysts doing an EDXA spectra. Sitting there, does he look over at some third-party document, or does he look at an MAS internal document to determine this is what I'm looking at?

MR. CIRSCH: Object to form.
THE WITNESS: I doubt he's looking at when he takes a spectra of either tremolite series or anthophyllite series that he's turning over and looking at a known reference. These analysts have been doing this for years and years and years.
We have references, but I can't imagine every time he takes an EDX spectra that looks the same time after time after time that he's looking at a third-party reference at that particular point in time.
Q. (By Mr. Chachkes) Okay. How many different analysts do you have doing EDXA spectra?
A. **Four.**
Q. Does NIST have an EDXA reference spectra for the various asbestos?
MR. CIRSCH: Object to form.
THE WITNESS: I think you already asked that. And besides not having a -- providing a TEM photo, they do not provide an actual spectra. But I think most -- I think there's a number of third-party references I believe just give you the ratios of what you would see in EDXA for the magnesium, the silicon, the

calcium, potentially some iron, tremolite, or actinolite.
Q. (By Mr. Chachkes) Why is EDXA useful?
A. **Provides the inorganic, and depending on your detector, organic chemistry of any particular elongated particulate.**
Q. When you look at an EDXA spectra, do you assume it's a regulated particle and then look to which regulated particles have the metal-to-silicon ratio that correspond?
MR. CIRSCH: Object to form.
THE WITNESS: Well, we typically don't do an EDX spectra unless it meets the definition of a regulated -- it has the potential for a regulated asbestos fiber or bundle.
So it's got to be at least .5 micrometers in length or greater, it's got to have an equal to -- greater than or equal to 5-to-1 aspect ratio, and parallel sides. Then the analyst -- first thing I would assume is do EDXA and check the chemistry. And then SAED.
Q. (By Mr. Chachkes) If your analyst sees something that's, what did you say, greater than .55 millimeters?
A. **Microns.**

Q. Microns, I'm sorry.
A. **Micrometers.**
Q. Okay. So strike that.
If your analyst sees something that's greater than .5 micrometers and has an aspect ratio of at least 5-to-1, then he might do EDXA?
A. **If it has parallel sides, yes. And he may do SAED. It doesn't matter which one. But then he would have to go through the sequence of determining if it meets the definition for the regulated asbestos chemistry and the crystalline structure.**
Q. Are there minerals that exist in the world other than regulated particles, regulated asbestos particles, that are greater than .5 micrometers and can have an aspect ratio of greater than 5-to-1?
MR. CIRSCH: Object to form.
Q. (By Mr. Chachkes) And with parallel sides?
A. **Yes.**
Q. Potentially dozens if not hundreds; right?
A. **I haven't counted them all up. But what we potentially see is asbestiform talc bundles or fibers all the time. So, yeah, you have to distinguish between a talc fiber or bundle and an anthophyllite fiber or bundle.**

Q. The question really is about minerals, so let's focus on what I've just asked, which is: There are potentially dozens if not hundreds of minerals that can have parallel sides, that can have -- be bigger than .5 micrometers, and have aspect ratios that are 5-to-1 or greater?
MR. CIRSCH: Object to form.
THE WITNESS: And I apologize, but I just stated I haven't counted them up. And really, we're not interested in the hundreds or whatever it is around the world.
It's primarily what do we find in the talc deposits that are asbestiform or fibrous and meet those definitions. And typically the only thing we routinely see is fibrous talc. Every now and then an antigorite fiber may show up.
But I don't -- to answer your question you asked, I haven't counted how many are out there.
Q. (By Mr. Chachkes) Does MAS conduct qualitative EDS analysis or quantitative EDS analysis?
A. **I believe every spectra in here is quantitative EDS analysis.**
Q. So you actually calculate the peak sizes and do the math?

A. We can, but we take the raw data, so that has to have at least 300 seconds of collection. But it's easy to do. You can actually calculate the concentration of the oxides under the peaks. We don't normally do that unless it's necessary.

Q. So when you -- just to summarize, when you do identification of mineral by EDXA, you are assuming that it's not any of the potentially dozens or hundreds of other minerals that aren't regulated; correct?

MR. CIRSCH: Object to form.

THE WITNESS: That's not what I said. I said I didn't know them all. But there's no minerals out there that has all the characteristics of a specific type of a regulated asbestos fiber, and that's why you go through the analytical process.

You can get other fibrous materials, but they'll have aluminum or the magnesium-to-silicon ratios are off. But you just don't see that many of these other than fibrous talc.

So of course we don't make an assumption what it is. That's why you do the chemistry and the selected area electron diffraction.

Q. (By Mr. Chachkes) How many minerals have the same constituent elements as regulated asbestos?

MR. CIRSCH: Object to form.

THE WITNESS: Don't know.

Q. (By Mr. Chachkes) It could be hundreds?

MR. CIRSCH: Object to form.

THE WITNESS: It's not a matter if it has the same constituents --

Q. (By Mr. Chachkes) My question was --

MR. CIRSCH: Hold on. Let him answer the question, please.

THE WITNESS: I haven't -- again, I haven't tried to sit down and go through all the minerals in the world that may have magnesium, silicon, or magnesium, silicon, and calcium. What's important is the ratio to the standards to the chemistry to the selected area electron diffraction.

MR. CHACHKES: Okay. Let's mark as Exhibit 12.

(Defendants' Exhibit 12 was marked for identification.)

Q. (By Mr. Chachkes) This is an extracted page from page 132 of your report. Do you recognize this as one of your EDXA spectra?

A. I do recognize it.

Q. Okay. Now, up at the top it says -- do you see where it says tremolite?

A. Yes.

Q. You typed that in, right, or your lab typed that in?

A. After they identified it, yes.

Q. Okay. What's the name of the software you use to generate this spectra?

A. You got me there. I don't know the name of the software. It's whatever the EDS system is on this particular one. It's not a light element detector. It comes with the EDXA system. I don't know what they call their software.

Q. Do you run the EDXA yourself?

A. Not anymore, no.

Q. Did you run any EDXA for any of the samples in the MDL?

A. No, sir.

Q. And walk me through how you determine the chemical composition of a -- what you're looking at from the spectra.

MR. CIRSCH: Object to form.

THE WITNESS: How far back do you want me to start?

Q. (By Mr. Chachkes) Well, let me ask you this.

A. Electrons hit the solid -- electron beam hits the solid with enough energy to eject elements out of their orbital.

Q. We're not --

A. You don't want me to go back that far?

Q. No.

A. Okay.

Q. So you look at the areas of the peaks; right?

A. No, what we -- we look at the peak ratios, the areas -- you can't look at the areas, but the peak ratios is what's important here. This is a typical tremolite with a small amount of iron, so this would not be enough iron to get into the actinolite range. There's no potassium. I don't see much of a sodium peak, so I would call this just tremolite.

So the electron beam is put on a spot size onto the bundle or fiber, and the system essentially is turned on and starts collecting x-rays from the different energy levels that are consistent with the different elements.

Q. Okay. Let's just focus on you said you

11:59:15 look at the ratios of the peaks; right?
11:59:18 MR. CIRSCH: Object to form.
11:59:19 **Q.** (By Mr. Chachkes) Am I misstating your
11:59:21 testimony?
11:59:21 **A. No. I guess I'm trying to understand what**
11:59:24 **you're asking. Maybe you should repeat the question.**
11:59:26 **Q.** Okay. You've got a -- I'm not asking how
11:59:30 the machine works. I'm asking you how you take this
11:59:33 result in Exhibit 12 and turn that into a conclusion.
11:59:38 So I'm asking do you look at the ratio of
11:59:43 the peak heights -- is that one of the things you
11:59:47 look at?
11:59:48 **A. Yes.**
11:59:48 **Q.** Okay. What's the ratio you look at
11:59:49 specifically?
11:59:51 MR. CIRSCH: Object to form.
11:59:52 THE WITNESS: You have a magnesium and
11:59:54 calcium peak that are pretty close. Typically
11:59:57 the calcium peak can be a little lower.
11:59:59 If it's a light element detector, the
12:00:01 magnesium can be a little higher, the silicon
12:00:05 will be your primary peak, somewhere in the 25
12:00:09 to 30 percent of the magnesium for a non-light
12:00:10 element detector. And the calcium peaks and the
12:00:15 magnesium peaks are usually very similar in

12:00:17 size.
12:00:17 And then we look at the amount of iron to
12:00:20 see if we're going to call it actinolite versus
12:00:23 tremolite. And not aware of any other minerals
12:00:27 out there that have those ratios, so that's how
12:00:34 I call it tremolite.
12:00:35 **Q.** (By Mr. Chachkes) When you say ratio,
12:00:36 what are you doing? You're adding, what, the height
12:00:38 of the metals to -- for the numerator and then on the
12:00:43 denominator is the height of the silicon peak?
12:00:47 **A. We're looking at the silicon peak versus**
12:00:49 **the magnesium and the calcium peak, and we're looking**
12:00:53 **at the magnesium and the calcium peak to determine**
12:00:56 **if -- how much they line up together. It could be a**
12:01:00 **little higher, it could be lower, but I would call it**
12:01:04 **typical tremolite peak.**
12:01:05 **Q.** And if I --
12:01:06 **A. Tremolite chemistry.**
12:01:08 **Q.** If I want to go to a third-party source
12:01:11 that confirms that this is the appropriate way to
12:01:13 analyze EDXA data, what would you point me to?
12:01:16 MR. CIRSCH: Object to form.
12:01:17 THE WITNESS: I'd have to look through the
12:01:21 protocols, but I believe they give you all the
12:01:24 ratios and say the AHERA, the ISO. They don't

12:01:28 give you a peak, but they'll write out what the
12:01:31 ratio ranges are.
12:01:33 **Q.** (By Mr. Chachkes) Okay. And those ratios
12:01:35 are -- are they simply the peak height, or do they
12:01:37 take into account the peak area?
12:01:39 **A. Well, the peak height and the peak area**
12:01:43 **are consistent. I mean, the peak area is going to --**
12:01:50 **the peak height is going to depend on the area,**
12:01:52 **because as the area of the peak builds up, that's**
12:01:56 **just more counts.**
12:01:57 **If you change the chemistry,**
12:01:59 **hypothetically, of, say, tremolite, you have added**
12:02:03 **more magnesium elements to it, you're going to have**
12:02:07 **higher peaks, so they're interrelated.**
12:02:10 **Q.** Do the standards that you're referring to
12:02:12 refer to simply peak height or they refer to peak
12:02:14 area?
12:02:14 MR. CIRSCH: Object to form.
12:02:15 THE WITNESS: All the standards in the TEM
12:02:17 protocols usually typically just give you
12:02:20 ratios. So I don't -- and if you look in the
12:02:24 identification, usually they will spell it out,
12:02:27 like this is the ratio for tremolite, this is
12:02:29 the ratio for chrysotile, and so on.
12:02:30 **Q.** (By Mr. Chachkes) My question is the

12:02:31 ratio of what? Is it ratio of just simply height, or
12:02:35 is it ratio of peak area?
12:02:38 **A. Peak area and peak height are**
12:02:40 **interchangeable. It's not -- the peak area, if**
12:02:44 **you're going to calculate the oxides -- the peak**
12:02:51 **area -- it's not the peak area.**
12:02:53 **Let's make it simple. It's not the peak**
12:02:55 **area. It's the peak height.**
12:02:57 **Q.** Okay. And that's what the standards say,
12:02:59 peak height?
12:03:00 MR. CIRSCH: Object to form.
12:03:01 THE WITNESS: I believe so.
12:03:01 **Q.** (By Mr. Chachkes) Okay. And one measures
12:03:03 that simply -- you just take a ruler and place it
12:03:06 vertically and you could get a peak height?
12:03:09 **A. Yeah, you could, if you wanted to.**
12:03:11 **Q.** Okay. Do you actually do that
12:03:12 quantitatively with numbers, or do you just kind of
12:03:15 eyeball it?
12:03:17 MR. CIRSCH: Object to form.
12:03:18 THE WITNESS: All the analysts would --
12:03:21 could probably draw that. You know, it's years
12:03:24 and years' experience. You don't have to take
12:03:25 the ratios. And if you look at the standards,
12:03:29 they will look pretty much identical to that.

But again, you have to be careful if you're looking at a windowless detector, which is more sensitive for the different elements.

Q. (By Mr. Chachkes) My question is about what your analysts actually do. Do they actually quantify the heights and run the numbers, or are they eyeballing it?

MR. CIRSCH: Object to form.

THE WITNESS: I think at this stage of their careers they're just visually confirming the proper elements and the proper ratios.

Q. (By Mr. Chachkes) And the software can generate those numbers; right?

A. The software generates the height? The ratios?

Q. Yes.

A. I don't know.

Q. So look at the bottom of Exhibit 12 in the bottom left. Do you see how it says magnesium, silicon, calcium, iron, down there on the bottom left; do you see that?

A. Yes.

Q. You can print out some -- there's data that goes there that the software can generate; correct?

A. That's correct.

Q. Why don't you generate it? Why don't you generate it?

MR. CIRSCH: Object to form.

THE WITNESS: There's no need to. It's not required for this type of analysis to identify tremolite.

Q. (By Mr. Chachkes) Do you have that data somewhere still saved in a machine somewhere?

A. That, I don't know.

Q. Okay. We are going to request that to be produced. I know your machine generates it. So if you could see whether you could produce that, we'd appreciate it.

MS. O'DELL: We'll consider your request. We're making no commitment we're going to do that.

MR. CHACHKES: Okay.

Q. (By Mr. Chachkes) You don't deliberately delete that data, do you?

MR. CIRSCH: Object to form.

THE WITNESS: No, sir, I have not deliberately deleted that data.

Q. (By Mr. Chachkes) You don't instruct your researchers to delete that data, do you?

MR. CIRSCH: Object to form.

THE WITNESS: No. It's just not -- that data is just not something I'm relying on for my opinions in this case.

Q. (By Mr. Chachkes) And that data being the specific numerical representation of the peak heights?

MR. CIRSCH: Object to form.

THE WITNESS: I believe what that gives you is the percentage of one element to the other, not peak heights.

Q. (By Mr. Chachkes) You're sure of that?

MR. CIRSCH: Object to form.

THE WITNESS: Pretty sure.

Q. (By Mr. Chachkes) Okay. But anyway, you didn't produce that data in your report, did you?

MR. CIRSCH: Object to form.

THE WITNESS: No, sir. It's not something that's required to render my opinions in this case --

Q. (By Mr. Chachkes) Okay.

A. -- in this MDL.

MR. CHACHKES: Let's just mark this as Exhibit 13.

(Defendants' Exhibit 13 was marked for

identification.)

Q. (By Mr. Chachkes) All right. Look on the last page of Exhibit 13. There appears to be an EDXA spectra; do you see that?

A. I do.

Q. And it appears to be generated by the same software as you're using. All the fonts are the same; everything appears to be the same. Do you have any opinion on that?

MR. CIRSCH: Object to form.

THE WITNESS: No.

Q. (By Mr. Chachkes) All that information on the lower left-hand corner in the Exhibit 13, you could generate that information; right?

MR. CIRSCH: Object to form.

THE WITNESS: I don't know if we have the same software, same software upgrades, so I can't comment on that.

Q. (By Mr. Chachkes) Can you generate that information that's down there in the lower left-hand corner --

MR. CIRSCH: Object to form.

Q. (By Mr. Chachkes) -- on Exhibit 13, last page?

A. And I don't mean to be disrespectful, but

12:07:00 **I don't know. I don't know if we have the same**
12:07:02 **updated software, et cetera, so I can't say one way**
12:07:05 **or the other.**
12:07:05 **Q.** Do you know whether the data you have from
12:07:13 your EDXA runs allows you to calculate numerical
12:07:20 values for the weight percentage of the elements?
12:07:23 **A. I believe I've just already stated I'm**
12:07:27 **not -- I don't know what software system we have and**
12:07:31 **can it do that or not.**
12:07:32 **Q.** Okay. And same question, so whether you
12:07:35 can generate the standard definitions or atomic
12:07:39 percentages or all those other ones, you just don't
12:07:43 know one way or the other whether you can calculate
12:07:46 those numbers using your EDXA apparatus?
12:07:50 MR. CIRSCH: Object to form.
12:07:51 THE WITNESS: It may be possible and we
12:07:52 may be able to. I just don't know until I ask.
12:08:01 **Q.** (By Mr. Chachkes) Do you know of any
12:08:06 third-party published source that approves of
12:08:11 eyeballing EDXA spectra to determine what the
12:08:14 composition of the material you're looking at?
12:08:17 MR. CIRSCH: Object to form.
12:08:17 THE WITNESS: Yes.
12:08:18 **Q.** (By Mr. Chachkes) What?
12:08:18 **A. All the assessors that ever walked in our**

12:08:25 **lab with the National Voluntary Laboratory**
12:08:26 **Accreditation Program do not require anybody to**
12:08:28 **measure peak heights and look at ratios for tremolite**
12:08:32 **or any of these.**
12:08:35 **You may want to make a green analyst who**
12:08:38 **hasn't been doing this for a while do that if he has**
12:08:41 **some issues, but it's not something that I've ever**
12:08:44 **seen the auditors say that is necessary.**
12:08:46 **Q.** Is there any --
12:08:47 MR. CIRSCH: Did you finish your answer?
12:08:49 THE WITNESS: Yes.
12:08:49 **Q.** (By Mr. Chachkes) Is there any
12:08:50 peer-reviewed literature that approves of eyeballing
12:08:54 EDXA patterns to determine the chemical composition
12:08:57 you're looking at?
12:08:58 MR. CIRSCH: Object to form.
12:08:59 **Q.** (By Mr. Chachkes) Peer-reviewed
12:09:00 literature.
12:09:00 **A. I don't know of any peer-reviewed**
12:09:02 **literature that says that comparing the spectras or**
12:09:07 **looking at the spectras and comparing them should not**
12:09:10 **be done, that you have to use a ruler for every one**
12:09:13 **of them. I'm not aware of any literature that states**
12:09:15 **that, peer-reviewed literature.**
12:09:16 **Q.** Not my question. Any peer-reviewed

12:09:19 literature that says eyeballing it is okay?
12:09:22 MR. CIRSCH: Object to form.
12:09:23 THE WITNESS: I wouldn't put it eyeballing
12:09:26 comparing to the standards and looking at the
12:09:28 ratios.
12:09:29 I'm not aware of any peer-reviewed
12:09:32 literature that makes that affirmative or
12:09:34 negative statement one way or the other.
12:09:36 **Q.** (By Mr. Chachkes) But you are aware of
12:09:37 peer-reviewed literature that uses actual
12:09:39 quantitative numbers and calculates the kind of
12:09:43 information we see in Exhibit 13 which is like weight
12:09:47 percentages; you're aware of that; right?
12:09:48 MR. CIRSCH: Object to form.
12:09:50 THE WITNESS: For this type of analysis
12:09:52 where you're just confirming, I'm not aware of
12:09:56 any. Maybe there is. Show some if you have
12:10:01 one.
12:10:01 **Q.** (By Mr. Chachkes) So when you say just
12:10:03 confirming, you're not using EDXA to determine in a
12:10:08 vacuum what I'm looking at. You've already made some
12:10:10 assumptions about what you may be looking at?
12:10:12 **A. No, we never make assumptions. We do the**
12:10:15 **chemistry, and the chemistry is unique. If you go**
12:10:18 **through here -- I was just looking at some. You**

12:10:19 **know, hornblende. Well, there's no aluminum in**
12:10:23 **tremolite. It's fairly straightforward.**
12:10:26 **Q.** Okay. You don't redact the information
12:10:38 that's in the lower left-hand corner of what's been
12:10:41 marked as Exhibit 12; right?
12:10:44 **A. No.**
12:10:44 MR. CIRSCH: Object to form.
12:10:45 **Q.** (By Mr. Chachkes) And you've never
12:10:46 redacted that information, have you?
12:10:48 MR. CIRSCH: Object to form.
12:10:49 THE WITNESS: No.
12:10:49 **Q.** (By Mr. Chachkes) Were they trained not
12:10:56 to fill in the lower left-hand corner, your analysts?
12:11:00 MR. CIRSCH: Object to form.
12:11:01 THE WITNESS: They weren't trained one way
12:11:02 or the other. It's not required for our
12:11:04 certifications. NVLAP does not require you to
12:11:09 run weight percentages, oxides, or any of that.
12:11:11 You have to demonstrate your ability to identify
12:11:16 regulated asbestos.
12:11:19 We've never had it be suggested that we
12:11:22 are misidentifying tremolite in any
12:11:26 circumstance.
12:11:27 **Q.** (By Mr. Chachkes) All right. So the
12:11:38 first step in analyzing an EDXA, though, is to

determine the ratio of the metals to silicon; right?

A. The first step?

Q. Yeah.

A. The first step -- the first step is to take the spectra and to verify that it is one of the regulated asbestos minerals -- regulated asbestos types that is of issue, or any issue, for any of them.

Q. Do you conclude you're looking at a regulated asbestos prior to doing the ratio analysis?

A. No.

Q. Okay. So prior to determining there's -- what you're looking at, what kind of mineral you're looking at, you determine the ratio of the metals to silicon; is that correct?

A. Before anything is done, we take the microchemistry of an individual fiber and look at the typical elements that you would expect.

Q. You seem to not want to answer about the EDXA.

MR. CIRSCH: I don't think he was finished answering it.

Q. (By Mr. Chachkes) All right. I'm talking about the EDXA.

A. That's what I'm saying.

Q. So you've got the EDXA result in your hands. This result, 12, before you've determined what it is, is the first step determining the ratio of metals to silicon --

MR. CIRSCH: Object to form.

Q. (By Mr. Chachkes) -- to interpret this EDXA?

A. The first step would be to look at this EDXA -- and I'm just speaking for me -- and I would see that the ratios are consistent with what I would expect for tremolite from the standards. That would be my first step.

Q. But you don't know whether those ratios are consistent with other minerals as well that are non-regulated?

MR. CIRSCH: Object to form.

THE WITNESS: I'm not aware of any ratios like that for any other non-regulated fibrous minerals.

Q. (By Mr. Chachkes) Are you excluding the possibility that they exist, or you're saying you're just not aware?

A. We've never seen them, so I guess I'm excluding the possibility that they exist.

Q. Okay.

A. It's hard to prove a negative, but it is not one of the look-alikes of that type of ratio that's fibrous. And of course we're leaving out the SAED to make sure it has an amphibole type diffraction pattern.

Q. Prior to any EDXA, you've already determined it's an amphibole?

A. No. Nothing is determined about this particular structure other than it's fibrous, it meets the counting criteria for what would be a regulated asbestos fiber if in fact the chemistry in the crystalline structure are consistent with the appropriate mineral.

Q. Okay. You would agree that two different minerals can have similar EDXA readouts; correct?

MR. CIRSCH: Object to form.

THE WITNESS: It depends on what you mean by similar. I can't answer that hypothetical.

Q. (By Mr. Chachkes) Okay. So, for example, anthophyllite and cummingtonite have similar EDXA spectra; correct?

A. That's correct. Anthophyllite, depending on the iron content, anthophyllite, cummingtonite, two regulated asbestos types, yes, they can have similar EDS.

Q. Okay. When you say EDS, you mean the same thing as EDXA?

A. Correct. I'm sorry. I'm old, and that's what we learned back in graduate school, it was EDS. It's hard for me to go to EDXA.

Q. All right. So you discussed your first step is to make some conclusions about what you're looking at just by eyeballing it.

The next step, do you determine the ratios of the metals to the silicon?

MR. CIRSCH: Object to form.

THE WITNESS: Well, let's back up here. I don't make any conclusions by eyeballing it.

The first thing we do is look at it and say this could match the counting rules for a regulated elongated particle.

It's at least greater than .5 micrometers in length. These are measurements. These are not eyeballing. It has parallel sides and has at least a 5-to-1 aspect ratio or greater.

Then the EDXA for me is taken to see if it is consistent with the ratios and patterns I would expect for some -- for the types of regulated asbestos fibers we're looking at.

And we're not saying, okay, we're going to

eliminate this type or that type. It's whatever's present.

Then the SAED -- so it has a typical amphibole diffraction pattern. If it's anthophyllite, potentially, we'll rotate the stage 10 to 20 degrees to eliminate the once-in-a-blue-moon reflection of a fibrous talc that some people claim that's close to anthophyllite.

And after all that, then we would -- I would say that is a regulated asbestos fiber type. It meets all the criteria.

You keep saying eyeballing. That's not really much of a term --

Q. (By Mr. Chachkes) My questions are all about --

MR. CIRSCH: Wait, he's not finished.

THE WITNESS: Wait. I'm not done.

MR. CIRSCH: You cut him off.

THE REPORTER: Wait. Wait. Wait.

THE WITNESS: What we're doing is we're looking at a set criteria. No decisions are made ahead of time. Nothing is -- well, I believe it's that type of thing. That doesn't happen.

Q. (By Mr. Chachkes) Let's start again. I'm only asking questions about EDXA.

Can you agree with me not to answer about TEM or SAED to the following sets of questions? I just want to know how you do EDXA. Can you do that?

MR. CIRSCH: Object to form.

THE WITNESS: I've already explained that to you.

Q. (By Mr. Chachkes) Okay. But can you answer these following questions only referring to EDXA? Can you do me that favor?

A. No.

Q. Okay.

A. If I feel that the question needs more explanation, an answer needs more explanation, I believe that's my right.

Q. Okay. You get the EDXA printout. At what point, if at all, do you calculate the ratio of metals to silicon for the EDXA?

MR. CIRSCH: Object to form.

THE WITNESS: I've already gone over that. I can't say anything more.

If I'm sitting at the TEM, I'm looking at the monitor and I'm determining -- and the ratios come up fairly quick. We have them

tagged for silicon, magnesium, calcium, iron, or whatever it happens to be, and the ratios are fairly distinct compared to any other mineral that I know out there, unless it's winchite or richterite, and then we're looking at a little bit of potassium or sodium.

Q. (By Mr. Chachkes) Okay. When you say the ratios come up quick, do you mean a precise number comes up on some screen?

A. This ratio -- magnesium, silicon, calcium, and iron -- is almost instantaneous. The only thing that changes as you count, they all simultaneously get higher. There is nothing else to it. You look at that, you compare to the regulated standards, and they all match.

Q. Okay. Looking at Exhibit 12, tell me what the ratios are there.

MR. CIRSCH: Object to form.

THE WITNESS: Say silicon is 10. Magnesium and calcium is approximately 3. The iron there would be less than 1.

Q. (By Mr. Chachkes) Okay. And that's how you kind of do it in the real world when you're analyzing EDXA spectra?

MR. CIRSCH: Object to form.

THE WITNESS: In the real world we have standards, and after doing it thousands and thousands of times, that's how it's done.

Q. (By Mr. Chachkes) Okay. Basically the way you just did it, I'm putting aside that you may have an encyclopedic knowledge of what to compare the ratios to. You generate ratios the way you've just done it, you look at it and you just read it and you come up with the ratios?

MR. CIRSCH: Object to form.

THE WITNESS: I'm not generating ratios. The tremolite fiber or bundle is generating the ratios by the x-rays that are being generated from the electron beam that are being counted at specific energies. Those ratios are fairly standard.

What I do is interpret the overall pattern and determine how well it matches with the tremolite standards that are in each of the TEM rooms.

Q. (By Mr. Chachkes) That step in the EDXA analysis where you determine the ratios, do you do it in the real world like we just saw now, you look at the spectra and you say, okay, silicon 10, magnesium, calcium 3, iron 1-ish, is that how you do it in the

real world?
MR. CIRSCH: Object to form.
THE WITNESS: In the real world I don't -- I look at the overall pattern, and the overall pattern is unique with the -- then it's an amphibole asbestos. And that's how every asbestos TEM lab in the country does it.
Q. (By Mr. Chachkes) Okay. So does the ratios of metal to silicon in the EDXA analysis have a material impact on your conclusions about what you're looking at?
MR. CIRSCH: Object to form.
THE WITNESS: The elemental spectras always have a material impact on what I'm looking at in the EDXA.
Q. (By Mr. Chachkes) I didn't ask about that. I asked about the specific ratio of metals to silicon.
Does that particular numerical ratio have a material impact on how you conclude what you're looking at under the EDXA?
MR. CIRSCH: Object to form.
THE WITNESS: I don't understand the question. I think I've answered it over and over. I'll answer it one more time.

Q. (By Mr. Chachkes) No, no. I want to make sure you understand it.
Do you understand what I mean by the ratio of metals to silicon; do you understand that?
A. Yes, sir.
Q. Okay. Do you calculate that number in your head, write it down, print it out? Do you calculate that number?
MR. CIRSCH: Object to form.
THE WITNESS: I don't know how I do it. Tremolite, the ratios to magnesium, silicon, and calcium are fairly unique. Not aware of any other fibrous materials that will have those specific ratios without some other additional elements such as aluminum and an amphibole diffraction pattern.
Q. (By Mr. Chachkes) Okay. You keep answering a different question, but what I heard is that you don't calculate the ratio. You actually run the numbers and calculate the ratios of metal to silicon; is that correct? You don't run that number?
MR. CIRSCH: Object to form.
THE WITNESS: I look at -- when I'm doing this, I look at every pattern and compare it to the standard patterns for those three elements,

and then the iron depends on if we're going to call it actinolite or tremolite. That's how I do it.
Q. (By Mr. Chachkes) Okay. Do you calculate the ratio of metals to silicon? Do you do that?
MR. CIRSCH: Object to form.
THE WITNESS: I think I've told you at least a half hour ago that I don't get a ruler out and measure each of the primary elements we're dealing with here, magnesium, silicon and calcium. I look at these distinct patterns, EDXA patterns, and can look at that and tell you that that is what matches for regulated tremolite asbestos.
Q. (By Mr. Chachkes) Okay. Putting aside that you don't get a ruler out, do you kind of sort of estimate that ratio of metals to silicon in your head when you do this analysis?
MR. CIRSCH: Alex, he's answered this question a number of times.
MR. CHACHKES: No, he said he doesn't take out a ruler.
MR. CIRSCH: A number of different times he's testified as to how he does the process. I'll let him answer it one more time and then

I'm going to instruct him not to answer --
MR. CHACHKES: You're at perfect liberty to shut the questions down at any point.
MR. CIRSCH: I know. I'm going to let him do it one more time.
MR. CHACHKES: Okay.
Q. (By Mr. Chachkes) Do you estimate -- putting aside whether you use a ruler or not to make it exact, do you estimate the ratio of metal to silicon in the EDXA spectra?
A. For at least the tenth time, and my last time, when I generate a spectra of -- and I'll just call it right now suspected regulated tremolite, I look at the overall pattern for magnesium, silicon, and calcium and determine that it is consistent with the standards, and that's how I make that determination.
Q. And is that overall pattern that you say you look at, is that the ratio of metals to silicon?
A. I am not answering this question anymore.
MR. CIRSCH: Object to form. That's it.
Q. (By Mr. Chachkes) All right. So you will not answer that question?
A. I've answered the question I'm estimating at least ten times.

12:24:33 **Q.** Okay. And you won't come back at some
12:24:36 point and say, yes, indeed, I calculate a number that
12:24:41 is the ratio of metals to silicon. You won't come
12:24:43 back and say that, will you?
12:24:43 MR. CIRSCH: Object to form.
12:24:44 Don't answer the question, Dr. Longo.
12:24:45 Move on, please, Counsel.
12:24:47 **Q.** (By Mr. Chachkes) Okay. Is the ratio of
12:24:52 metals to silicon for tremolite the same for every
12:24:55 EDXA printout?
12:25:00 **A. I think I've already gone over it a couple**
12:25:04 **of times that depending on your detector, your EDXA**
12:25:08 **detector, if it is a silicon drifted, lithium drifted**
12:25:13 **window or windowless detector, these ratios will**
12:25:17 **change because it's more sensitive.**
12:25:19 **For example, for chrysotile, even though**
12:25:21 **there is more magnesium in the formula than silicon,**
12:25:28 **regular -- with a silicon window you will see less**
12:25:32 **magnesium. So it just depends on the EDS system.**
12:25:38 **We have both types. So you could see a**
12:25:40 **tremolite spectra from the windowless detector that**
12:25:45 **will look different than the other one as you're**
12:25:47 **getting ready to pull out.**
12:25:48 **Q.** Are you aware that anthophyllite has a
12:25:51 ratio in the books published to be 7 to 8 for metals

12:25:56 to silicon? Are you aware of that?
12:25:58 MR. CIRSCH: Object to form.
12:25:58 THE WITNESS: I don't know. I would have
12:25:59 to look at it.
12:26:00 **Q.** (By Mr. Chachkes) Okay. And you're not
12:26:02 looking to see whether there's a ratio of 7 to 8
12:26:05 metals to silicon, are you?
12:26:07 MR. CIRSCH: Object to form.
12:26:08 THE WITNESS: For anthophyllite, we look
12:26:10 at the EDXA standards, typically the NIST
12:26:16 standards, for that pattern -- I've already told
12:26:18 you I don't get out a ruler and measure these --
12:26:22 that the spectra has to be consistent, and it
12:26:25 has to be for the type of EDXA detector you're
12:26:29 using.
12:26:29 **Q.** (By Mr. Chachkes) It's a very simple
12:26:31 question. Do you look for a 7 to 8 ratio metals to
12:26:35 silicon --
12:26:35 MR. CIRSCH: Object to form.
12:26:36 THE WITNESS: And it's a very simple
12:26:38 answer. We look at the standard NIST type
12:26:40 spectras that give you the patterns for
12:26:42 potentially anthophyllite or potentially fibrous
12:26:46 talc.
12:26:48 **Q.** (By Mr. Chachkes) Are you aware that

12:26:49 tremolite has a published ratio for EDXA metals to
12:26:52 silicon of 5-to-8?
12:26:55 MR. CIRSCH: Object to form.
12:26:55 THE WITNESS: Published where?
12:26:57 MR. CIRSCH: Yeah, will you show him the
12:26:58 document if your --
12:26:59 **Q.** (By Mr. Chachkes) Are you aware of any
12:27:00 publication that has that?
12:27:01 **A. I don't know. Show me the publication and**
12:27:03 **I'll take a look at it, and I'll have to look at what**
12:27:07 **conditions this ratio is for what type of detector.**
12:27:11 **Q.** Okay. So sitting here today, you can't
12:27:14 point me to a peer-reviewed publication that has
12:27:17 anything other than a 5-to-8 ratio for tremolite?
12:27:24 MR. CIRSCH: Object to form. You're
12:27:26 holding something in your hand. Why don't you
12:27:28 show --
12:27:28 THE WITNESS: I don't know. I'd have to
12:27:29 look at the publication. We look at the NIST
12:27:31 standards for determining if we have tremolite,
12:27:34 anthophyllite, anthophyllite solid solution
12:27:37 series, the tremolite solid solution series.
12:27:39 **Q.** (By Mr. Chachkes) Do the NIST standards
12:27:41 have ratios of metals to silicon?
12:27:43 **A. The NIST -- as I think we already talked**

12:27:45 **about, I don't believe the NIST standards sends you**
12:27:47 **any information other than this is tremolite or this**
12:27:49 **is anthophyllite or this is actinolite or this is**
12:27:53 **crocidolite or this is amosite.**
12:27:54 **Q.** Okay.
12:27:54 MR. CIRSCH: As soon as you get to a good
12:27:56 place, Alex, maybe we can take a lunch break.
12:27:59 MR. CHACHKES: Okay.
12:27:59 **Q.** (By Mr. Chachkes) Do you know what the
12:27:59 International Mineralogical Association is, the IMA?
12:28:04 **A. I don't know.**
12:28:06 **Q.** Okay. Are you aware -- so I guess you
12:28:10 wouldn't be aware they contain a comprehensive list
12:28:14 of minerals in their chemical formulas?
12:28:16 MR. CIRSCH: Object to form.
12:28:17 THE WITNESS: I'm sure they do.
12:28:18 **Q.** (By Mr. Chachkes) Have you ever looked at
12:28:20 that?
12:28:20 **A. I don't know.**
12:28:29 **Q.** Okay. So would you agree with the
12:28:31 statement that talc and anthophyllite have materially
12:28:35 similar chemistries so it can be difficult to
12:28:38 distinguish them on EDXA?
12:28:41 MR. CIRSCH: Object to form.
12:28:42 THE WITNESS: Yes and maybe.

12:28:45 **Q.** (By Mr. Chachkes) Okay. What part is
12:28:46 yes?
12:28:47 **A. Yes, they have similar chemical makeup.**
12:28:50 **Q.** And maybe they can be difficult to
12:28:52 distinguish on EDXA?
12:28:53 **A. Maybe, depending on the chemistry. But we**
12:29:00 **don't distinguish fibrous talc from anthophyllite by**
12:29:05 **just EDXA.**
12:29:06 **Q.** Okay. Am I correct that it can be
12:29:09 difficult under EDXA to distinguish anthophyllite
12:29:14 from talc?
12:29:16 MR. CIRSCH: Object to form.
12:29:17 THE WITNESS: I don't know about how
12:29:18 difficult or not difficult. It's not something
12:29:20 we do to distinguish anthophyllite from talc
12:29:22 just on the EDXA other than, okay, it has the
12:29:25 appropriate chemistry.
12:29:28 MR. CHACHKES: Okay. We can take a break
12:29:32 here. Lunchtime.
12:29:33 (Lunch recess from 12:29 p.m. to 1:35 p.m.)
13:36:03 **Q.** (By Mr. Chachkes) Dr. Longo, you had
13:37:02 mentioned before that you had looked at industrial
13:37:05 talc for asbestos; is that correct?
13:37:06 **A. Yes.**
13:37:07 **Q.** And for whom did you do that work?

13:37:10 **A. For whom? Which plaintiffs' attorney?**
13:37:13 **Q.** Sure.
13:37:14 **A. I don't recall.**
13:37:18 **Q.** For what client, company, did you do that
13:37:20 work?
13:37:21 **A. I haven't done any work for any client**
13:37:29 **companies that I'm at liberty to talk about for**
13:37:38 **industrial talc.**
13:37:45 **Q.** Okay. I'm just asking you yes or no, do
13:37:48 you remember the names of the companies or company?
13:37:50 **A. I can't talk about any potential work we**
13:37:53 **may or may not have done for an industrial talc**
13:37:56 **company.**
13:37:56 **Q.** No, this is just a yes or no. Do you
13:37:58 remember the name? I'm not asking for the name, just
13:38:01 do you remember the name?
13:38:03 **A. Again, I'm not saying I have or I haven't.**
13:38:06 **I'm just not at liberty if I have and if no report**
13:38:10 **has been issued, at liberty to talk about it.**
13:38:13 **Q.** Okay. You mentioned that you might have
13:38:15 looked at industrial talc for plaintiff lawyers. Was
13:38:18 that recent?
13:38:19 **A. I think the most recent one was back in**
13:38:21 **2017 for the Kazan firm.**
13:38:24 **Q.** Okay. And you just don't know whether

13:38:26 that was associated with a particular company?
13:38:30 **A. Oh, the company, it was Nytal Vanderbilt**
13:38:35 **talc.**
13:38:35 **Q.** Okay. But this is plaintiffs' side?
13:38:39 **A. Yes, sir.**
13:38:39 **Q.** What about the first time you ever looked
13:38:43 at industrial talc for asbestos, when was that?
13:38:45 **A. As I testified earlier, sometime in the**
13:38:47 **1990s or early 2000s.**
13:38:50 **Q.** Was that one engagement? Multiple
13:38:56 engagements?
13:38:57 **A. I don't recall.**
13:38:58 **Q.** It could be one engagement; you just don't
13:39:00 remember?
13:39:01 **A. I'm sure it's more, but I just don't**
13:39:02 **recall.**
13:39:03 **Q.** Greater than five? Less than five?
13:39:05 **A. I don't know what size bread box it is.**
13:39:09 **Q.** Okay. So you've established probably more
13:39:12 than one, but after that you can't say?
13:39:14 **A. I just don't recall.**
13:39:15 **Q.** Okay. What about more than one; you can
13:39:17 say it's more than one?
13:39:19 MR. CIRSCH: Object to form.
13:39:20 THE WITNESS: I believe so.

13:39:21 **Q.** (By Mr. Chachkes) Okay. And did you
13:39:22 personally do the TEM work on that?
13:39:23 **A. Back in those days, probably.**
13:39:27 **Q.** Did you do any -- personally do any PLM
13:39:30 work?
13:39:30 **A. No.**
13:39:30 **Q.** Personally do any XRD work?
13:39:32 **A. No.**
13:39:32 **Q.** Personally do any EDXA work?
13:39:35 **A. Well, when I do TEM for this type of work,**
13:39:38 **I would have done EDXA.**
13:39:40 **Q.** Okay. Can you estimate in that engagement
13:39:44 or engagements in the 1990s, early 2000s range, how
13:39:49 many hours you would have spent?
13:39:51 **A. No.**
13:39:52 **Q.** Could be under ten; could be over ten?
13:39:55 **A. I don't recall.**
13:39:56 **Q.** You know who McCrone is; right?
13:39:59 **A. I do.**
13:40:00 **Q.** You know they have people there who teach
13:40:02 graduate courses related to detecting asbestos?
13:40:05 MR. CIRSCH: Object to form.
13:40:06 THE WITNESS: I know they have continuing
13:40:10 education courses, yes.
13:40:11 **Q.** (By Mr. Chachkes) Have you ever taught at

a graduate school?
A. Not in this type of work, no.
Q. Okay. In what type of work?
A. Well, I was visiting assistant professor, so it would have been materials science.
Q. Okay. Nothing to do with detecting asbestos?
A. No.
Q. Do you know McCrone's Particle Atlas?
A. Yes.
Q. And that's something folks other than McCrone use as a standard in this field?
A. Yes.
Q. Have you ever published anything that other people outside of your lab use as a standard?
MR. CIRSCH: Object to form.
THE WITNESS: Not in a book, no.
Q. (By Mr. Chachkes) What about otherwise?
A. Yes, if you go to Federal Mogul's and search for wollastonite detection, one of our protocols was published by them for the determination of tremolite asbestos in wollastonite for Federal Mogul involving their manufacture of OEM brakes.
Q. What is Federal Mogul? I'm not familiar with that.

A. It's a company that owns a bunch of companies.
Q. Okay. So you published -- I'm sorry, say it again. What does it stand for?
A. Well, I didn't publish it. We wrote a protocol for determining a problem they were having with the supplier of a mineral called wollastonite, which is a substitute fibrous material, and the particular source that they were using stated that it had a small amount of tremolite contamination in it.
Q. Okay. Did you ever published a standard for finding asbestos that was for the general scientific community, not for just one specific client?
MR. CIRSCH: Object to form.
THE WITNESS: I was in charge of the ASTM and the D2205 committee for the analysis of -- number count analysis of asbestos in settled dust. It's the D5755, I believe it is.
Q. (By Mr. Chachkes) Okay. And that has your name on it?
A. No. ASTM standards have ASTM on it.
Q. Okay. And that was -- that standard -- the contributors were many more people than you; right?

A. Yes. Some people contributed, but I was in charge of -- it was our method that we had given to the EPA. Then it was fighting over the definitions.
Q. Have you or MAS published any standard for finding asbestos in any material or any mineral or anywhere that is attributable exclusively to you or MAS?
A. No.
Q. Have you published a methodology for finding asbestos in talc?
A. Have not.
Q. You're aware that McCrone has done that; right?
MR. CIRSCH: Object to form.
THE WITNESS: Jim Millette, yes, I'm aware, 1990 and 2015, I believe, are the two papers in Microscopy.
Q. (By Mr. Chachkes) You're aware that McCrone has testing and training classes related to finding asbestos; correct?
MR. CIRSCH: Object to form.
THE WITNESS: They teach a -- used to, anyway, the McCrone Institute. May still do it.
Q. (By Mr. Chachkes) Have you ever taught or

trained -- sponsored teaching or training classes for finding asbestos for people outside of MAS?
A. I've given a couple lectures and taught an all-day two-day seminar at the American Industrial Hygiene Association to help train, to give certified industrial hygienists or industrial hygienists how to perform TEM analysis for asbestos.
Q. Okay. Other than that, any?
A. At Georgia Tech in their continuing education program involving asbestos, seminar up at Southern University of New York, I have taught there for a week. Again, it was TEM analysis for asbestos.
Q. Okay. Was it for finding talc, asbestos in talc?
A. No, it was just general finding asbestos in whatever you wanted to look in.
Q. Have you or MAS given any training or classes relating to finding asbestos in talc?
A. No.
Q. Has any School of Public Health asked you to assist them in finding asbestos in talc?
A. No.
Q. You're aware that a number of governmental bodies are out there, not just in the U.S. but elsewhere, looking into the question of whether

asbestos is in cosmetic talc; correct?
MR. CIRSCH: Object to form.
THE WITNESS: I'm aware of Canada and maybe India, maybe. I've seen some articles.
Q. (By Mr. Chachkes) Okay. Have any of those -- any governmental body, U.S. or otherwise, asked you to assist in determining whether cosmetic talc has asbestos?
MR. CIRSCH: Object to form.
THE WITNESS: No.
Q. (By Mr. Chachkes) Has any federal court ever said that your methodology for finding talc in -- asbestos in talc passes Daubert standards?
A. **I'm not sure I've had a Daubert standard in federal court yet. As for state court, I think there's been seven, six or seven challenges.**
Q. So my question is about federal court. Has any federal court certified you under Daubert standards for finding asbestos in talc?
MR. CIRSCH: Object to form.
THE WITNESS: As I just stated, I don't believe I've been in federal court yet other than this one for -- where any Daubert challenges would arise.
Q. (By Mr. Chachkes) Has your methodology

for finding asbestos in talc ever been published in a peer-review journal or literature otherwise?
MR. CIRSCH: Object to form.
THE WITNESS: Well, it's not my method, and the Blount method by PLM has been published and the ISO 22262-2 is an international standard. So it's not my method; it's standard protocols for doing the method.
Q. (By Mr. Chachkes) Is all your analysis for -- all your analysis of cosmetic talc for asbestos been for and sponsored by plaintiffs' lawyers?
A. **Yes.**
Q. You mentioned the NVLA. What is that?
A. **National Voluntary Laboratory Accreditation Program for the determination of asbestos in air samples by TEM and bulk analysis.**
Q. Does the NVLA have an accreditation for finding asbestos in talc?
A. **It's hard to say because they don't really dictate what the matrix is.**
Q. When you say matrix, what do you mean by that?
A. **Well, it's just asbestos in materials. I'm not sure they have a specific one for talc or a**

specific one for joint compound or a specific one for thermal insulation. It's just a matter of being able to determine and detect and to record what is present.
Q. Okay. Does the NVLA have an accreditation standard for finding talc in something other than air, like in -- I'm sorry, strike that.
Does the NVLA have an accreditation standard for finding asbestos in something other than air, like in talc?
MR. CIRSCH: Object to form.
THE WITNESS: Well, they accredited to the EPA 600/R-93 PLM method. That's not specific for talc. It's building materials.
Q. (By Mr. Chachkes) And do they accredit you for methodology or something else?
A. **To be able to perform the analysis.**
Q. Meaning what?
A. **Meaning if you -- we have round-robins that you can adequately identify products that have a certain concentration of asbestos in it that you would routinely see for building products.**
Q. Has NVLA ever accredited you specifically for finding talc in asbestos?
A. **I think, as I've already stated, they**

don't have a previous matrix, meaning what is the asbestos in. They go by the EPA 600/R-93 method for analysis of bulk samples, typically building material bulk samples for asbestos.
Q. So the NVLA, did they actually have someone come to your lab and do this accreditation?
A. **Yes.**
Q. Okay. When that person came to your lab for the accreditation, did they ask to see your techniques and methodologies for finding asbestos in talc?
MR. CIRSCH: Object to form.
THE WITNESS: Again, they don't say talc and they don't say any particular thing. It's just your overall methodology for performing the analysis. And usually the auditor will bring samples and have the analyst be able to determine the type and the estimated weight percent of what's in the sample.
Q. (By Mr. Chachkes) Okay. So the samples that the NVLA brought for you to analyze for your accreditation were not talc samples; correct?
A. **I don't believe so, no.**
Q. They were just straight-up samples of different kinds of asbestos; right?

13:49:30 **A. In some building material.**
13:49:32 **Q.** Okay. Is the NVLA accreditation standard
13:49:38 public?
13:49:39 **A. When you -- I don't understand what you**
13:49:40 **mean.**
13:49:40 **Q.** Obviously, they must have some standard
13:49:42 that they're comparing you to. Is that written down,
13:49:44 or is it just in the minds of the NVLA?
13:49:49 MR. CIRSCH: Form.
13:49:50 THE WITNESS: I mean, there is a set this
13:49:50 is what you have to do and be able to do, plus
13:49:54 the PAT rounds that's sent out by the Research
13:50:02 Triangle Institute where they send samples out,
13:50:05 your analysts have to analyze them and send them
13:50:08 in, and they compare to see if you pass or fail.
13:50:10 **Q.** (By Mr. Chachkes) Okay. My question was
13:50:14 do they have published standards?
13:50:16 MR. CIRSCH: Object to form.
13:50:17 **Q.** (By Mr. Chachkes) Something written down
13:50:17 where I can look at it and read on the page, ah, this
13:50:20 is how they accredit me?
13:50:22 MR. CIRSCH: Object to form.
13:50:23 THE WITNESS: I think you can go to the
13:50:24 NIST website for this type of -- and download
13:50:29 it. I'm sure it's public.

13:50:32 **Q.** (By Mr. Chachkes) Now, you've run NIST
13:50:36 standards for EDSA; correct?
13:50:39 **A. Correct.**
13:50:39 **Q.** How often do you run those?
13:50:43 **A. I think you asked me earlier. I don't**
13:50:45 **recall. I brought some here because since we were**
13:50:48 **looking at the EDXA or talking about EDXA of**
13:50:53 **tremolite, it's in my reliance documents where we**
13:50:56 **measured the EDXA on 200 tremolite fibers and bundles**
13:51:02 **showing you the, quote, pattern.**
13:51:06 **Q.** I'm sorry, you're talking about the NIST
13:51:08 standard right now?
13:51:08 **A. Yes.**
13:51:09 **Q.** Okay. So you analyzed 200 NIST standards?
13:51:11 **A. Well, 200 particles in a NIST standard.**
13:51:13 **Q.** Okay. So you've at least done one NIST
13:51:16 standard. Have you done more than one NIST standard?
13:51:19 **A. We have analyzed all the NIST standards to**
13:51:26 **generate standards of EDXA.**
13:51:29 **Q.** Same for SAED?
13:51:31 **A. Yes.**
13:51:32 **Q.** Same for TEM?
13:51:35 **A. Well, TEM would be EDXA and SAED.**
13:51:39 **Q.** Okay. And do you keep those materials,
13:51:45 the standards you run?

13:51:46 **A. I believe so.**
13:51:47 **Q.** Okay. And you said you brought something.
13:51:49 What did you bring?
13:51:50 **A. Well, I brought the EDXA on 200 tremolite**
13:51:55 **fibers and bundles that was done, the 1867.**
13:52:01 **Q.** Oh, I'm sorry, so this is something you've
13:52:04 already produced; you just brought it -- also brought
13:52:05 it?
13:52:06 **A. Yes.**
Q. Okay.
13:52:06 **A. I mean, it's in my reliance documents, and**
13:52:08 **it can give you a -- if you look at the ratios,**
13:52:14 **they're pretty much identical to what you were**
13:52:16 **showing me here.**
13:52:17 **Q.** Okay. And did you bring any other
13:52:25 documents that haven't been produced?
13:52:27 Did you bring any documents that haven't
13:52:28 been produced?
13:52:29 **A. Well, these have been produced.**
13:52:31 **Q.** Right. So I'm asking separate and apart
13:52:33 from that.
A. Oh.
13:52:34 **Q.** Did you bring any documents today that
13:52:35 haven't been produced?
13:52:36 **A. No.**

13:52:36 **Q.** Okay. So those are your NIST samples for
13:52:45 EDXA; right?
13:52:47 **A. Right. We were looking at the**
13:52:48 **Addison-Davies method to see if boiling the acid --**
13:52:52 **boiling the tremolite in sulfuric acid for an hour**
13:52:56 **and then boiling it in sodium hydroxide for an hour,**
13:53:00 **did it change any chemical component or size**
13:53:03 **distribution of the NIST standard.**
13:53:05 **Q.** Did you produce your NIST standard
13:53:07 analysis for TEM?
13:53:11 **A. That is TEM.**
13:53:11 **Q.** Okay. All right. For what about PLM, did
13:53:15 you produce those?
13:53:16 **A. No.**
13:53:16 MR. CIRSCH: Object to form.
13:53:18 THE WITNESS: You typically -- since it's
13:53:21 almost 100 percent tremolite, it's not usually a
13:53:23 standard that you develop for PLM. You can look
13:53:25 at it and check your refractive indices and make
13:53:30 sure -- the oblique extinction, et cetera, but
13:53:34 you don't usually just run those.
13:53:36 **Q.** (By Mr. Chachkes) Okay. So when you say
13:53:37 you don't usually, you did not run NIST standards for
13:53:40 PLM; is that what I'm hearing?
13:53:42 **A. I don't know if we have. I don't believe**

13:53:44 **so.**
13:53:44 **Q.** Okay. If you did, would you have kept the
13:53:47 material?
13:53:48 MR. CIRSCH: Object to form.
13:53:49 THE WITNESS: I don't know.
13:53:50 **Q.** (By Mr. Chachkes) Okay. We would ask any
13:53:51 of that material be produced.
13:53:54 Any other NIST standards that you ran
13:53:57 under any other instruments that we haven't talked
13:53:59 about?
13:53:59 **A. No.**
13:54:14 MS. TROVATO: I'm sorry, I have Exhibit 10
13:54:15 to this deposition --
13:54:16 MR. CIRSCH: That's been marked at a
13:54:18 previous deposition.
13:54:18 THE WITNESS: That was marked on 3/21.
MS. TROVATO: I want to mark it here.
13:54:21 MR. CHACHKES: Okay. Can we mark this as
13:54:22 Exhibit 14.
13:54:24 (Defendants' Exhibit 14 was marked for
13:54:33 identification.)
13:54:33 **Q.** (By Mr. Chachkes) Okay. So Exhibit 14 is
13:54:34 what you were just referring to as the -- you ran a
13:54:37 NIST standard and the Addison-Davies technique,
13:54:39 that's 14; right?

13:54:40 **A. Yes, sir.**
13:54:40 **Q.** Okay. Looking back at -- can you go back
13:54:46 to Exhibit 12, which is the EDXA spectrum.
13:54:54 If I handed this to a very experienced
13:55:00 EDXA scientist, as experienced as you want, and I
13:55:06 gave him no context where it came from, you know,
13:55:12 anything other than just this printout, would they
13:55:14 identify this as tremolite and only tremolite?
13:55:17 MR. CIRSCH: Object to form.
13:55:18 THE WITNESS: I can't opine about what
13:55:20 other people would do. If I looked at this, my
13:55:24 reaction would be that looks like tremolite.
13:55:27 **Q.** (By Mr. Chachkes) Okay. I'm not talking
13:55:28 about you. Again, this is about the question of what
13:55:32 a third-party would and how they would interpret
13:55:37 this.
13:55:37 Would somebody who is a very experienced
13:55:39 EDSA scientist look at this spectra and say I know
13:55:47 what this is, this is tremolite? Or are there other
13:55:50 minerals that are consistent with this?
13:55:53 MR. CIRSCH: Object to form.
13:55:54 THE WITNESS: I can't speculate on what
13:55:55 other experienced TEM folks would do. I can
13:55:58 just tell you, since I'm sitting here, that I
13:56:02 would say that's probably tremolite.

13:56:04 **Q.** (By Mr. Chachkes) Okay. Again, I know
13:56:05 what you think. So these questions aren't about what
13:56:08 you think.
13:56:09 Do you think a third-party scientist
13:56:11 looking at Exhibit 12, without knowing context, just
13:56:15 looking at what's in Exhibit 12, this EDSA spectrum,
13:56:18 might say that also corresponds to minerals that
13:56:23 aren't tremolite?
13:56:25 MR. CIRSCH: Object to form. He's already
13:56:26 answered the question. It calls for
13:56:28 speculation.
13:56:28 THE WITNESS: I can't speculate what other
13:56:30 experienced microscopists would say that is.
13:56:34 **Q.** (By Mr. Chachkes) Okay. And so you can't
13:56:36 testify to a reasonable degree of scientific
13:56:39 certainty that this EDSA pattern in a vacuum can only
13:56:46 correspond to a single mineral and only that mineral
13:56:50 tremolite?
13:56:50 MR. CIRSCH: Object to form.
13:56:52 THE WITNESS: Within a reasonable degree
13:56:56 of scientific certainty, if I looked at this
13:56:57 mineral, I would say that looks like tremolite.
13:56:59 **Q.** (By Mr. Chachkes) So I'm not asking about
13:57:00 you. I'm asking -- this is a question about
13:57:02 reproducibility, that if some other scientist looked

13:57:06 at this, not you, okay, that are you testifying that
13:57:12 within a reasonable degree of scientific certainty
13:57:15 that this pattern can only correspond to tremolite?
13:57:20 MR. CIRSCH: Object to form.
13:57:21 THE WITNESS: I can't speculate what other
13:57:22 scientists -- and they wouldn't be much of a
13:57:25 scientist if they were going to look at this in
13:57:28 a vacuum and then make some judgment on it
13:57:31 without sitting at the TEM.
13:57:32 If another very experienced scientist was
13:57:34 sitting at a TEM looking at the counting rules
13:57:39 and it's a regulated asbestos, he would most
13:57:42 likely have some information about where it came
13:57:45 from --
13:57:45 **Q.** (By Mr. Chachkes) Okay. So the counting
13:57:46 rules, how do they apply to Exhibit 12, the EDSA?
13:57:49 **A. Well, again, you cut me off. What I'm**
13:57:53 **saying is I don't believe it would be a very -- that**
13:57:56 **it's very scientific to sit in a vacuum and not know**
13:58:00 **anything about anything and look at this, and how am**
13:58:04 **I supposed to know what some other experienced**
13:58:06 **scientist is going to say or do?**
13:58:07 **Q.** Okay. I'll represent to you I've shown
13:58:10 this, what's in Exhibit 12, to a very experienced
13:58:15 mineralogist who also does EDXA work, and that

13:58:19 1 person's confirmed that this is not a unique pattern
13:58:22 2 for tremolite, that there are other minerals that
13:58:24 3 correspond.
13:58:25 4 Sitting here today, do you have anything
13:58:26 5 to provide me that disputes that?
13:58:28 6 MR. CIRSCH: Object to form. I mean, how
13:58:30 7 can he possibly testify to that?
13:58:36 8 MR. CHACHKES: I mean, limit the speaking
13:58:37 9 objections, please.
13:58:38 10 THE WITNESS: It's EDXA. This came off a
13:58:41 11 tremolite fiber bundle that we verified, that in
13:58:45 12 the matrix that this came out of, it's well
13:58:48 13 established that those type of amphiboles are
13:58:50 14 formed.
13:58:52 15 What some other expert or experienced
13:58:57 16 microscopist is saying that it's going to be
13:59:00 17 confused with some other minerals, I can't
13:59:02 18 comment on it. If you'd like to tell me what
13:59:05 19 those minerals are, I could certainly look and
13:59:08 20 see if there's -- (cell phone rings.)
13:59:10 21 Is that me? I'm sorry. It's not supposed
13:59:16 22 to be on. I apologize.
13:59:24 23 **Q.** (By Mr. Chachkes) What work have you done
13:59:28 24 to survey the world of minerals to determine what
13:59:36 25 other minerals other than regulated asbestos could

13:59:40 1 have EDSA patterns that correspond to what I'm
13:59:46 2 looking at in Exhibit 12?
13:59:47 3 MR. CIRSCH: Object to form.
13:59:48 4 THE WITNESS: I've looked at all the
13:59:49 5 potential look-alikes, and again, you just can't
13:59:53 6 do an EDS pattern without looking at the
13:59:56 7 structure. Some -- and I've looked at every one
13:59:59 8 that Sanchez says that could be look-alikes, and
14:00:06 9 a number of them are not fibrous and a lot of
14:00:09 10 them have aluminum in it. So I'm not concerned
14:00:13 11 that this is anything but tremolite asbestos.
14:00:18 12 **Q.** (By Mr. Chachkes) Did you look at any
14:00:25 13 databases to compare this spectra to what the
14:00:28 14 databases say are the things that have similar EDSA
14:00:33 15 patterns?
14:00:33 16 MR. CIRSCH: Object to form.
14:00:34 17 THE WITNESS: No, I didn't look at any
14:00:37 18 databases. This was done in regards to the
14:00:39 19 typical TEM protocols for identifying asbestos.
14:00:42 20 I'm not aware of any other minerals with all the
14:00:46 21 characteristics of both being fibrous, meaning
14:00:48 22 the counting definition, the amphibole
14:00:54 23 diffraction pattern for the d-spacings. This is
14:00:57 24 not misidentified.
14:00:59 25 **Q.** (By Mr. Chachkes) Okay. Did you look

14:01:00 1 at -- and I'm just talking about the EDSA now, I'm
14:01:03 2 not talking about counting or things that aren't the
14:01:06 3 EDSA -- I'm sorry. EDXA. Let me start that again.
14:01:11 4 I'm talking about just the EDXA now, not
14:01:15 5 talking about other methods of identifying what
14:01:17 6 you're looking at. Did you look at any textbook or
14:01:21 7 peer-reviewed literature to see what this pattern
14:01:27 8 could also -- in Exhibit 12 -- could also correspond
14:01:30 9 to?
14:01:30 10 MR. CIRSCH: Object to form.
14:01:31 11 THE WITNESS: It doesn't correspond -- and
14:01:32 12 you're --
14:01:33 13 **Q.** (By Mr. Chachkes) The question is what
14:01:34 14 you looked at.
14:01:34 15 **A. Please don't interrupt.**
14:01:37 16 MR. CIRSCH: Let him answer the question,
14:01:38 17 please.
14:01:39 18 THE WITNESS: You're trying to do this in
14:01:40 19 a vacuum. Here's just an EDS pattern, I'm not
14:01:42 20 going to give you any other information, I'm not
14:01:43 21 going to let you look at what kind of -- it's a
14:01:45 22 fibrous structure or it's a particulate. Not
14:01:46 23 going to let you look at the SAED patterns.
14:01:50 24 It's not following the procedure we've
14:01:52 25 used here for all these samples. So I can't

14:01:55 1 comment on something that I wouldn't do as an
14:01:58 2 expert coming in here just looking at an EDS
14:02:01 3 pattern with -- EDXA pattern without any other
14:02:04 4 information.
14:02:04 5 **Q.** (By Mr. Chachkes) Okay. So am I correct
14:02:06 6 that your answer is no, you did not look at a
14:02:09 7 textbook or peer-reviewed literature to determine
14:02:11 8 what this EDSA pattern could also correspond to other
14:02:15 9 than what you believe to be tremolite?
14:02:16 10 MR. CIRSCH: Object to form.
14:02:17 11 THE WITNESS: No. I wouldn't just take an
14:02:19 12 EDS pattern by itself and then run it to see
14:02:23 13 what other possible minerals in the world have
14:02:26 14 the same elements.
14:02:27 15 I would only be testifying here that this
14:02:29 16 is tremolite -- regulated tremolite asbestos
14:02:33 17 based on the entirety of the analysis that's
14:02:35 18 done for each of these fibers or bundles.
14:02:37 19 **Q.** (By Mr. Chachkes) Okay. Let's talk about
14:02:39 20 SAED for a moment. You did SAED pattern analysis?
14:02:43 21 **A. Yes.**
14:02:43 22 **Q.** Okay. Would you agree that the more
14:02:49 23 complete the SAED pattern an analyst obtains, the
14:02:52 24 more likely the analyst is to make an accurate
14:02:55 25 determination of the crystal structure?

14:02:56 MR. CIRSCH: Object to form.
14:02:58 THE WITNESS: No.
14:02:59 **Q.** (By Mr. Chachkes) Why not?
14:02:59 **A. For tremolite you just need the d-spacings. For anthophyllite, you just need to -- if it has anything close to the reflection or the crystal orientation of fibrous talc, you just need to turn it to make sure that the amphibole pattern comes up. You don't need to do anything more to adequately identify if it's anthophyllite versus fibrous talc or anthophyllite solid solution series.**
14:03:28 **Q.** Okay. Is streaking in your SAED pattern something that can get in the way of an accurate determination?
14:03:35 **A. It depends on what type of asbestos it is. If you're seeing streaking and you have the right chemistry and it's tubular, then it's chrysotile. But we don't see the streaking that's getting -- that you say is getting in the way to adequately look at these diffraction patterns.**
14:03:51 **Q.** If the dots on an SAED pattern are out of focus, does that affect the accuracy in your determining the crystal structure?
14:03:59 **A. Depends what you mean by out of focus. As long as you have the particular planes of dots, how**

14:04:04 **focused or out of focus it is sometimes doesn't matter. If it's way out of focus, yes, it would.**
14:04:09 **Q.** Would you agree that it's important to -- strike that.
14:04:13 Would you agree that the further out you have complete dots in the pattern and the more focused the image it is, the easier it is for the analyst to study the crystal structure?
14:04:28 MR. CIRSCH: Object to form.
14:04:29 THE WITNESS: It depends.
14:04:32 **Q.** (By Mr. Chachkes) What does it depend on?
14:04:34 **A. Well, I have to get some examples and I can show you. You know, the patterns we have taken have been adequate for the analyst, plus the EDXA plus the fibrous nature to identify appropriately if it's -- typically what we're seeing is either the tremolite solid solution series, more tremolite than winchite or richterite or actinolyte, and anthophyllite solid solution series. We don't take it any further than that.**
14:05:02 **Q.** So you testified that to determine whether something is tremolite, you just need to know the d-spacing; correct?
14:05:08 MR. CIRSCH: Object to form.
14:05:09 THE WITNESS: And the EDXA as well as

14:05:11 the -- if it is fibrous or not. That's all you need.
14:05:16 **Q.** (By Mr. Chachkes) Okay.
14:05:17 **A. And that's all NVLAP requires.**
14:05:21 **Q.** Okay. And that's expressly written in the NVLA standard?
14:05:28 **A. I don't know if it's expressly written, but it's not required for any of the audits that we have, zone axis patterns for tremolite or any regulated asbestos.**
14:05:37 **Q.** Okay. So your opinion is that good science is determined by whether something passes NVLA accreditation?
14:05:43 MR. CIRSCH: Object to form.
14:05:44 THE WITNESS: It is good science. I don't know what good science mean. I mean, versus bad science?
14:05:51 NVLAP is coming in to determine that if somebody sends you an air sample that you can adequately identify, or bulk sample, identify the asbestos to the degree that you're not letting people walk into an environment where they're getting exposed to asbestos.
14:06:07 We go to the -- so that we perform the necessary analytical techniques for each of

14:06:14 these methods to positively affirm or deny that there's any detectable asbestos present.
14:06:21 **Q.** (By Mr. Chachkes) Does the NVLA have in it an example of d-spacing that corresponds to tremolite?
14:06:29 MR. CIRSCH: Object to the form.
14:06:30 THE WITNESS: I believe so.
14:06:31 **Q.** (By Mr. Chachkes) Okay. And we'd find that on their website?
14:06:35 MR. CIRSCH: Object to form.
14:06:36 THE WITNESS: I think so.
14:06:37 **Q.** (By Mr. Chachkes) Okay. And then you said for anthophyllite, what do you need, again?
14:06:40 **A. For us, anthophyllite, we just make sure it's not fibrous talc, since we're looking at talc samples. And that the anthophyllite chemistry, the anthophyllite solid solution chemistry is appropriate, what we typically see is, because we're using heavy density liquid primarily, I think, all here, all with what I call iron-rich.**
14:07:07 **Q.** My question is what SAED pattern corresponds to anthophyllite?
14:07:12 MR. CIRSCH: Object to form.
14:07:13 THE WITNESS: Which one? There's 277 zone axes. We look for a typical d-spacing of a

different orientation for the two selected area electron diffraction patterns we take.

Q. (By Mr. Chachkes) Okay. So you determine whether it's anthophyllite based on d-spacing when you're talking about SAED only?

MR. CIRSCH: Object to form.

THE WITNESS: D-spacing and a second pattern from a different crystalline orientation so that you can rule out fibrous talc.

Q. (By Mr. Chachkes) Okay. So for tremolite, do you use two axes or just one?

A. Just one. It's not required for tremolite since fibrous talc does not have any calcium in it. And what you're looking for in an EDS pattern is make sure there's no aluminum.

Q. Okay. And for anthophyllite, you use -- you need two axes is what you're saying?

A. Two axes unless -- I think there's one in the entire bunch where we only did one.

One axis if it doesn't have that pseudohexagonal pattern of talc. There's one reflection in talc -- I can't remember if it's the 020 -- that some people say are similar. Doesn't look similar to me. But we just do two anyway for all these anthophyllite fibers and bundles.

Q. Okay. For talc you use two axes to determine whether the SAED pattern corresponds to talc?

A. No, we use two for anthophyllite solid solution series.

Q. What about talc, how do you determine something under SAED is talc?

A. Chemistry and one SAED pattern that has the hexagonal dot pattern.

Q. Okay. So you use -- for the SAED portion of identifying something as talc, you use only one pattern; is that correct?

A. That's correct.

Q. Okay. If I took that one pattern that you use to identify talc under SAED, can that pattern only correspond to talc?

MR. CIRSCH: Object to form.

THE WITNESS: It can only correspond to talc as long as you have the chemistry to go along with it. Again, nothing here is done in a vacuum of just one and nothing else.

Q. (By Mr. Chachkes) Okay. My question really isn't a vacuum. And I understand your qualification you think it's completely unfair, but I do want to hear what you have to say about this.

If I have an isolated SAED pattern for talc in one axis and only that, no other information, does that uniquely identify talc?

MR. CIRSCH: Object to form.

THE WITNESS: I would not call it. I don't know what somebody else would do. I would want to see what we're looking at. Certainly if it's a talc plate versus chemistry -- but we're primarily interested in the fibrous talc.

If you're an experienced TEM analyst, you wouldn't just do it -- to me, my opinion, you just wouldn't try in a vacuum without any information to look at a talc SAED and say that's talc.

Q. (By Mr. Chachkes) Okay. So recall that when I asked you my question, I'm saying looking at SAED in a vacuum and then you went on to talk about a number of things that aren't SAED, like chemistry, fibers, plates. So this is a very specific question and yes or no. Does a one-axis SAED pattern for talc uniquely identify this as talc?

MR. CIRSCH: Object to form. He's already answered the question.

THE WITNESS: I would not call it talc just based on a one hexagonal pattern with no

other information.

Q. (By Mr. Chachkes) Okay.

A. I would want to do -- and have the rest of the information that we talked about.

I wouldn't do it. Maybe somebody else would. I can't comment on what other people might or might not do.

Q. Okay. So for tremolite, you are saying you look at one axis as well; correct?

A. Correct.

Q. So same question. In a vacuum, all you have is the SAED pattern for one axis for something you otherwise would call tremolite. Does that uniquely and only identify tremolite?

MR. CIRSCH: Object to form.

THE WITNESS: If you were going to do that, and you were -- for whatever reason that here is an SAED pattern, there is nothing else, if it was a zone axis, then you'd have to get two zone axes, and now you're dealing with like no chemistry, no idea where the tremolite fiber came -- if it is tremolite.

So I would not do it. I can't talk about what other people would do.

Q. (By Mr. Chachkes) Okay. And indeed, a

single axis SAED pattern for something that in your report corresponds to tremolite can also correspond to many other crystalline structures as well; correct?

MR. CIRSCH: Object to form.

Q. (By Mr. Chachkes) Just in a vacuum. Again, with all the qualifications that you don't want to do it in a vacuum, but my question is in a vacuum.

MR. CIRSCH: Object to form.

THE WITNESS: It would be a typical amphibole diffraction pattern. You could say it's an amphibole, but how far you're willing to go on that on just that without any other information, no chemistry, no structure interface, no morphology, I would not call it tremolite.

Q. (By Mr. Chachkes) Okay. So for anthophyllite, where you have two axes and so like two SAED patterns, in a vacuum, do those two patterns sitting in front of you, no other information, uniquely identify what you're looking at as anthophyllite?

MR. CIRSCH: Object to form.

THE WITNESS: I don't know. Certainly

would rule out talc with the two patterns.

If I wasn't told that this came out of a cosmetic talc bulk sample and wasn't allowed to look at any chemistry, if I wasn't allowed to do any EDXA and morphology, I probably would not spend the time contemplating what that was.

Q. (By Mr. Chachkes) Okay. You agree that the same particle can have different SAED patterns at different orientations; right?

A. Yes.

Q. And an SAED analyst can take measurements of the crystals on various axes; correct?

A. Yes. You can get zone axis, and depending on the orientation of the fiber or bundle, you may get two -- tough to get three because of your limited mobility of tilting the fiber; you have to double tilt it. You could probably get three if one wanted.

Q. Okay. Are you an expert in SAED pattern analysis?

A. I probably know more than the average layperson.

Q. Okay. But are you an expert? Are you somebody, for example, who maybe published any articles on SAED pattern analysis?

MR. CIRSCH: Object to form.

THE WITNESS: I have not published any, no.

Q. (By Mr. Chachkes) Have you taught SAED pattern analysis?

A. Been a while, but yes.

Q. To whom?

A. Graduate students back in the day when I was visiting assistant professor.

Q. How many orientations do you need to uniquely identify a mineral with SAED and only SAED?

A. A minimum of two, maybe three.

Q. Measurements on an SAED are taken in angstroms; correct?

A. Yes, sir, an angle, angle between -- you identify, say, the 002, then you have to get to another orientation, say, the 010 or the minus 020, and then take the angles and do the measurements or use CrystalMaker.

Q. Okay. CrystalMaker software that helps you analyze?

A. Well, as long as it has the appropriate standards in it, you could.

Q. Do you use CrystalMaker?

A. We have CrystalMaker. But, no, it's not required for what we do.

Q. Okay. If you put what you otherwise identified as an SAED pattern for tremolite into CrystalMaker without the other end pop, the identification, this is tremolite?

MR. CIRSCH: Object to form.

THE WITNESS: If you had the appropriate zone axis and nothing else, it might.

Q. (By Mr. Chachkes) You don't know one way or the other? Have you ever done that?

A. Have we used CrystalMaker? We have used it in the past, but we don't use it for this analysis.

Q. So have you done CrystalMaker on a single axis? Have you used CrystalMaker for a single axis SAED pattern?

MR. CIRSCH: Object to form.

THE WITNESS: I don't recall doing that.

Q. (By Mr. Chachkes) Okay. When I talked about measurements being taken in angstroms, that's the measurement between the dots; right?

A. Yes.

Q. And that's what we're calling d-space?

A. D-space is between the planes. That's the measurement we do now.

Q. What's the difference between what I said

and what you said?

A. Well, you can get to the different planes, but you can also get to -- the d-spacing is the layers of atoms on top of each other.

Q. Okay. Can you describe how your analyst calibrates the SAED apparatus?

A. They do.

Q. No, I'm sorry, can you describe how they do it?

A. Well, they get the working distance, and typically they're using a gold standard for the rings and the working distance so they can do that calibration.

Q. When you say a gold standard, what do you mean by that?

A. Well, you take something that's fibrous and you put a gold film on the top so that you get the outer rings of the gold, which is a standard measurement, and then the working distance so you can calibrate.

Q. Literally a standard made of gold; is that what you're saying?

A. Yes. Well, it's a very small piece of gold wire --

Q. Okay.

A. -- that you sputter, so you're not using a lot.

Q. How often do your analysts calibrate the SAED apparatus?

A. Whatever is required for our NVLAP accreditation.

Q. Do you have any -- sitting here today, do you know what that is?

A. No.

Q. Is that in your report?

A. No, sir.

Q. Okay. So do your analysts tilt the stage on the TEM to direct the electrons at a certain face of the crystal?

MR. CIRSCH: Object to form.

THE WITNESS: The only fibrous material that we tilt the stage is when we suspect the anthophyllite solid solution series, where we rotate it to make sure that the hexagonal plane -- it's not even the hexagonal plane. It's a -- I always forget. It's either an 020 or an 002 reflection off the talc, fibrous talc orientation.

Q. (By Mr. Chachkes) Okay. Can you point me to published peer-reviewed literature where that's an

appropriate way to identify that mineral?

MR. CIRSCH: Object to form.

THE WITNESS: I can't. I mean, as I sit here, I don't recall.

Q. (By Mr. Chachkes) Okay. Are the TEMs in your lab equipped with -- I'm going to butcher the -- is it goniometer?

A. Goniometer.

Q. Okay. Are the TEMs in your lab equipped with goniometers to rotate particles?

A. Yes. We have a double-tilt holder that we use if we're going to do zone axis. And we have a goniometer that can rotate the sample I think up to 30 degrees, so it's usually at zero tilt.

Q. Okay. In your report I don't see any SAED patterns done for a single subject crystal in three different axes. That's correct; right?

A. That is correct, you will not find that.

Q. And you didn't do that?

A. No.

Q. Okay. Did your analyst document every instance in the report where they used multiple SAED patterns?

A. I hope so.

MR. CHACHKES: Maybe we should -- let's go

to this one.

(Defendants' Exhibit 15 was marked for identification.)

Q. (By Mr. Chachkes) Okay. Marked as Exhibit 15, you recognize this as a three-axis SAED for tremolite; right?

A. I know that's what it states.

Q. In your opinion, is that different? Is this not a three-axis?

A. Well, it says it's -- you know the 100, the 010, and the 001, that would be three crystal orientations by the Miller indices. Now, if that's what we're looking at here or not, I would have to go measure it, get the camera constant, et cetera.

So I'm not here to dispute it, but I can't validate that's what it is.

Q. Is there anything -- looking at this right now, is there any reason you have to dispute that indeed this is an accurate three-axis SAED for tremolite?

MR. CIRSCH: Object to form.

THE WITNESS: I have no reason to dispute it. I have no reason to accept it.

Q. (By Mr. Chachkes) Okay.

A. If that's what you're saying it is, then

14:21:22 **that's what you're saying.**
14:21:23 **Q.** Okay. You see that the pattern is
14:21:26 different for each of the three axes?
14:21:27 **A. Well, you have three different crystal**
14:21:29 **orientations.**
14:21:30 **Q.** Okay.
14:21:31 **A. Of course it's going to be different.**
14:21:32 **Q.** Okay. So you predicted my next question,
14:21:36 which is in your experience, three different crystal
14:21:38 orientations for SAED for the same crystal may or
14:21:42 probably will produce three different patterns;
correct?
14:21:44 **A. That is correct.**
14:21:44 **Q.** Okay. For tremolite it certainly will
14:21:48 produce three different patterns?
14:21:50 **A. For most of your fibrous crystals where**
14:21:54 **you can rotate it, yes.**
14:21:56 **Q.** Including anthophyllite and fibrous talc?
14:22:01 MR. CIRSCH: Object to form.
14:22:02 THE WITNESS: Including -- no. Fibrous
14:22:02 talc, not. You can rotate it. You're only
14:22:05 going to get one pattern. That's why if you do
14:22:09 see the reflection that some people will argue
14:22:12 looks a little bit like what anthophyllite can
14:22:15 do, you rotate it, and that never changes.

14:22:51 MR. CHACHKES: Okay. Let's mark as 16.
14:22:53 (Defendants' Exhibit 16 was marked for
14:23:07 identification.)
14:23:07 **Q.** (By Mr. Chachkes) Okay. So do you
14:23:09 recognize what's been marked as Exhibit 16?
14:23:10 **A. Yes, Verification of 0-Degree Amphibole**
14:23:13 **Diffraction Patterns, these are our documents.**
14:23:16 **Q.** Okay. This was produced to us, I think,
14:23:20 Saturday. Do you recall giving this to plaintiffs'
14:23:23 counsel recently --
14:23:24 **A. I do.**
14:23:24 **Q.** -- to produce?
14:23:27 Okay. What is it? Can you just -- on a
14:23:28 high level, what am I looking at?
14:23:31 **A. High level, we're looking at the**
14:23:32 **d-spacings of, most likely, tremolite and**
14:23:40 **anthophyllite.**
14:23:40 **Q.** And this corresponds to a number of
14:23:49 samples that appear in your report; correct?
14:23:51 **A. It does.**
14:23:51 **Q.** Okay. And to figure out which page
14:23:56 relates to which diffraction pattern, I can look on
14:24:01 that page and it's written in there somewhere; right?
14:24:06 **A. You'll have to -- I'm sorry.**
14:24:07 **Q.** I think I might have messed that up

14:24:12 linguistically. I'm going to do that again.
14:24:13 **A. That's fine.**
14:24:13 **Q.** If I want to figure out which sample a
14:24:17 particular verification page refers to, that sample
14:24:20 is written on the page; correct?
14:24:21 **A. Yeah, each sample number is on here.**
Q. Okay.
14:24:24 **A. You know, M68503-001. So you would look**
14:24:28 **for '60, '70s, '80s, wherever it is, and then the**
14:24:36 **second number, -001, would be the number 1 or the**
14:24:38 **first asbestos structure or bundle that is the**
14:24:42 **diffraction pattern is being taken.**
14:24:44 **Q.** Sorry. And you went a little quick for
14:24:47 me, and I apologize --
14:24:49 **A. That's all right. So you see the number**
14:24:50 **there, M68503 --**
14:24:51 **Q.** Okay. So I see that as MAS job number.
14:24:53 That's where you're pointing?
14:24:54 **A. Right.**
14:24:55 **Q.** And can you actually, just so we're on the
14:24:55 same page, literally, can you go to the first
14:25:00 verification?
14:25:00 Okay. So you've got the MAS job number,
14:25:02 and I'm looking at the number that begins M68
14:25:05 something, something, something. Okay. How does

14:25:06 that tell me what sample that refers to?
14:25:09 **A. Well, our job number would be M68503. If**
14:25:14 **you go to the various '60s, '70s, and '80s, you'll**
14:25:17 **see that number.**
14:25:18 **Q.** Sorry. Let's pause. '60s, '70s, and
14:25:21 '80s, you're referring to year --
14:25:22 **A. The decades.**
Q. Okay.
14:25:23 **A. And so then you look for -- if it has**
14:25:26 **M68503 on there, you look for the first dash, 001.**
14:25:31 **Q.** And what's the first dash refer to?
14:25:33 **A. Right. That will tell you that that is**
14:25:35 **the actual sample number. Then you can go -- it will**
14:25:39 **tell you what tab to look under.**
14:25:41 **And then the second sample number is 001,**
14:25:44 **means that is the first asbestos, in this case,**
14:25:49 **anthophyllite solid solution series. It's the very**
14:25:53 **first structure up. So you can go then to the data**
14:25:56 **there and find that very first diffraction pattern.**
14:25:59 **Q.** Okay. But when you say the data there, is
14:26:02 that data you're referring to in Exhibit 16?
14:26:04 **A. No, the data that is in the actual data**
14:26:07 **notebooks.**
14:26:07 **Q.** Got it. And your ability to identify
14:26:12 '60s, '70s, '80s decades, is that something inherent

14:26:17 in the job number? Is that like coded in there? How
14:26:19 did you --
14:26:19 **A. That's why I used all of them.**
14:26:20 Q. Oh, okay.
14:26:21 **A. If you'll give me one, I can -- you know, I can probably find it. I didn't bring those along. They're getting too big.**
14:26:26 Q. Okay. I see on this page, date verified
14:26:31 11/19/18; do you see that?
14:26:33 **A. Yes.**
14:26:35 Q. What does that mean? What was verified?
14:26:37 **A. That means that's the date that the data was run for this particular program that did this analysis.**
14:26:44
14:26:45 Q. Is that the date of the SAED as well?
14:26:48 **A. No. If you go over to the right-hand side, it says date of photo --**
14:26:51
14:26:53 Q. Okay.
14:26:54 **A. -- 10/29/2018, and the SAED pattern should have that date on it.**
14:26:57
14:26:58 Q. Got it. And when you say the data was run
14:27:02 on November 19, 2018, was it put into some computer
14:27:07 program, or someone did a hand d-spacing? How was
14:27:11 that --
14:27:12 **A. No. The information is put in, it's all**

14:27:14 **digital, and it does the calculation. When you put**
14:27:17 **in the, you know, the distance, the camera constant,**
14:27:22 **and then it will calculate the d-spacing.**
14:27:24 Q. I'm sorry, when you say it, there's a
14:27:26 software that you're using?
14:27:28 **A. Yes.**
14:27:28 Q. And does the software kind of just read
14:27:30 the image? You don't have to actually calculate the
14:27:32 d-spacing by hand?
14:27:33 **A. Well, you have to put in the information**
14:27:35 **on the camera constant, but then it will read the**
14:27:39 **pattern and calculate what the d-spacing is.**
14:27:42 Q. Got it. And do you know the name of that
14:27:44 software?
14:27:45 **A. I do not.**
14:27:46 Q. Is that on your computer?
14:27:48 **A. It's on the TEM computers.**
14:27:52 Q. Okay. The numbers that it generates for
14:27:57 d-spacing, is that fully disclosed here on this page?
14:28:03 **A. Yes.**
14:28:04 Q. Okay.
14:28:05 **A. Over here on the calculated spacing of**
14:28:07 **5.23, and if you go to anthophyllite, the d-spacing**
14:28:11 **is in that range of 5.02 to 5.54 on the range, plus**
14:28:17 **or minus 5 percent.**

14:28:19 Q. And is the reason that zone axis
14:28:22 information on the lower left is not put in there is
14:28:24 because you really only ran one?
14:28:26 **A. Well, you can get a zone axis -- if you**
14:28:28 **happen to hit a zone axis, it will -- you can**
14:28:34 **calculate through that. The second anthophyllite**
14:28:36 **pattern for this one fiber on the next page has a**
14:28:41 **zone axis that said it was near the 101.**
14:28:43 Q. Got it. So you're saying is that the
14:28:48 first verification page that I'm looking at is one
14:28:51 zone axis, and the second page is another zone axis
14:28:54 for the same anthophyllite particle?
14:28:55 **A. No. Not quite.**
14:28:57 Q. Okay.
14:28:57 **A. The first one is just d-spacing, the**
14:28:59 **second one is just d-spacing. In this particular**
14:29:02 **case when they went to the second orientation, they**
14:29:05 **got very close to the 101 zone axis.**
14:29:08 Q. Okay. So there's two orientations on
14:29:11 these page 1 and page 2, one is one orientation, the
14:29:14 second is another orientation?
14:29:16 **A. Correct, for the same fiber/bundle.**
14:29:18 Q. Got it. We've looked through this, and
14:29:22 we've totaled 35 samples, which is less than the 72
14:29:28 samples in your report. Is that consistent with what

14:29:31 you believe this to be?
14:29:34 MR. CIRSCH: Object to form.
14:29:35 THE WITNESS: Well, a number of samples
14:29:38 were negative. There would be no zone axis
14:29:42 pattern.
14:29:42 A number of the samples would not have
14:29:45 been run through because we were doing
14:29:46 verification of Lee Poye's samples, and there's
14:29:51 a lot of different samples. I believe we have
14:29:53 produced all the ones that we have taken.
14:29:55 Q. (By Mr. Chachkes) Okay. There were 50
14:29:57 positives amongst the 72 samples you looked at, and
14:30:00 yet only 35 samples for which we have the diffraction
14:30:08 verifications. Am I incorrect there?
14:30:11 MR. CIRSCH: Object to form.
14:30:13 THE WITNESS: Well, a number of positive
14:30:15 samples there was no TEM because it was
14:30:19 negative. The Lee Poye verification on his, he
14:30:25 had six negatives where we found it positive by
14:30:29 PLM. And then an extra sample. I'll have to
14:30:35 add it all up now. I believe you have
14:30:38 everything if we went through and did the math.
14:30:40 Q. (By Mr. Chachkes) Okay. You had
14:30:41 personally in your lab, MAS, 50 positives; right?
14:30:46 MR. CIRSCH: Object to form.

14:30:47 **Q.** (By Mr. Chachkes) Let's strike that. All
14:30:57 right.
14:30:57 So the top of your own supplemental report
14:31:00 reads that -- I'm going to read a sentence from your
14:31:05 report, This new information changed the total number
14:31:07 of containers/samples analyzed from 71 to 72 and the
14:31:11 total positive samples from 49 to 50.
14:31:14 That's accurate; right?
14:31:15 **A. Yes.**
14:31:15 **Q.** Okay. If there are 50 positives -- let's
14:31:19 only talk about the positives. If there are 50
14:31:21 positive, why only have verifications for 35?
14:31:24 **A. Well, off the top of my head, five of the**
14:31:29 **positives out of six is from Lee Poye's analysis. We**
14:31:34 **did not verify his negative samples. Those became**
14:31:38 **positive because of the Blount PLM and the ISO PLM.**
14:31:43 **Also, the two samples in Lee Poye where we could not**
14:31:47 **verify the nine out of 11, they became positive by**
14:31:52 **PLM. So now we're up to seven.**
14:31:55 **Q.** Of the 15 we're missing; right?
14:31:58 **A. Not missing any.**
14:31:59 **Q.** Okay.
14:31:59 **A. Now there's a number of samples through**
14:32:02 **here where the PLM and/or ISO was positive and the**
14:32:05 **TEM was not. If the TEM is negative, there's no**

14:32:09 **SAED. I think that will get you to your number.**
14:32:13 **Q.** Got it.
14:32:15 So if there was a positive under TEM in
14:32:19 the MAS laboratory, I've got the verification here in
14:32:23 Exhibit 16?
14:32:26 **A. You are supposed to.**
14:32:31 MS. O'DELL: Let me just insert an
14:32:31 objection. There were a number of I think six
14:32:33 files that were produced very similar to
14:32:35 Exhibit 16, so they're not all contained in that
14:32:37 exhibit and --
MR. CHACHKES: And I agree --
14:32:44 MS. O'DELL: The record shouldn't reflect
14:32:45 that they are. There are five more documents
14:32:48 that are very similar to Exhibit 16 --
MR. CHACHKES: Yeah.
14:32:51 **Q.** (By Mr. Chachkes) And I apologize.
14:32:51 Everything I said was correct, except you have to
14:32:54 take the six files that you gave me, put them
14:32:57 together, and we only have 35.
14:32:58 **A. I understood that.**
14:32:59 MR. CHACHKES: Okay. So as long as the
14:33:01 witness understood, I think we're good.
14:33:03 MS. O'DELL: That's not true, but I'm glad
14:33:06 we clarified.

14:33:08 MR. CHACHKES: Well, I interpret "I
14:33:09 understood" differently than you do.
14:33:11 **Q.** (By Mr. Chachkes) Was a diffraction --
14:33:12 okay. Skip that.
14:33:14 Now, what are these ranges up here at the
14:33:20 top? I see like a table. What's that? The same
14:33:25 table appears to be reproduced in every single
14:33:27 verification page; am I right?
14:33:28 **A. Right. That gives you the amphibole**
14:33:30 **types, the page number it's on, card number for the**
14:33:33 **mineral pallet diffraction file, and it gives the**
14:33:37 **calculated spacings in the range.**
14:33:39 **So these d-spacings are all tied back to a**
14:33:44 **standard that every lab should have for these**
14:33:50 **particular type of regulated asbestos structures.**
14:33:53 **Q.** Okay. The page number refers to a page of
14:33:57 what, in the table?
14:33:59 **A. Page of the Mineral Powder Diffraction**
14:34:02 **File Data for that particular mineral.**
14:34:03 **So grunerite will be found on page 449.**
14:34:07 **It will be card number 31-631. And on that card**
14:34:11 **number it will give you the calculated d-spacings for**
14:34:15 **that particular mineral.**
14:34:16 **Q.** Okay. So it's a page within the Mineral
14:34:21 Powder Diffraction File, and then in that page is

14:34:23 something called a card. I imagine that's like a
14:34:25 little box?
14:34:26 **A. Correct. And it will give you all the**
14:34:30 **d-spacing information that's published here.**
14:34:32 **Q.** Okay. And the range, I see in the last
14:34:37 column on the right, that's the margin of error?
14:34:41 **A. Correct.**
14:34:42 **Q.** Now, if I'm reading this correctly, U4, on
14:34:47 this first page of the verification, you calculated a
14:34:50 spacing of 5.23; correct?
14:34:53 **A. Correct.**
14:34:54 **Q.** And that falls within every single
14:34:57 amphibole types range in that chart?
14:35:01 **A. That's correct.**
14:35:01 **Q.** How is it you identified this as
14:35:08 anthophyllite when it falls within five different
14:35:13 d-spacing ranges?
14:35:15 **A. Do I get to use the other data that's**
14:35:17 **generated, or is this one of those in a vacuum type**
14:35:19 **questions?**
14:35:20 **Q.** Let's say in a vacuum. In a vacuum.
14:35:22 MR. CIRSCH: Object to form.
14:35:23 THE WITNESS: I wouldn't -- if I just had
14:35:25 the d-spacing without any information, I
14:35:28 wouldn't make that call. I wouldn't say that it

was anthophyllite. I would say it is consistent with the typical amphibole d-spacing.

Q. (By Mr. Chachkes) Okay. What other amphibole in the Mineral Powder Diffraction File have d-spacing ranges that span 5.23?

A. Most of your amphibole minerals, both monoclinic and orthorhombic, will have d-spacings in this range.

Q. What about nonamphiboles, are there nonamphibole crystals that have d-spacings that the range covers 5.23?

A. I don't believe so.

Q. The --

A. Are we done with this one?

Q. For now, yes.

Let's go to another exhibit. That's going to be -- let her mark it up.

A. Oh. Sorry.

MR. CHACHKES: That's going to be 17.

(Defendants' Exhibit 17 was marked for identification.)

Q. (By Mr. Chachkes) Is this the same sort of document as 16? Is this one of the --

A. Yes.

Q. Okay. At the top, I see that for your

SAED analysis you have an equation to determine spacing; do you see that?

A. We have the camera constant divided by the measured distance, yes.

Q. Okay. And in your -- your methodology determined the spacing by dividing the camera constant by the measured distance; is that correct?

A. Correct.

Q. And why does MAS use this formula?

A. That's the standard formula. You can -- the pixels is part of the computer program where you could -- in the old days you'd actually measure it.

Q. Can you provide a reference in the scientific literature that reflects this equation?

A. CrystalMaker has it.

Q. CrystalMaker software; right?

A. Software. Yes, somewhere I can find it from the old days the formula for this.

Q. Okay. You didn't cite anything in your paper, correct, in your reports; correct?

A. No, because it's a standard method that all TEM labs do that do this, so.

Q. The manual -- I'm sorry, the measured distance than the denominator, that's manually measured, or is that measured automatically by

software?

A. It's measured off the image that's been calibrated.

Q. Okay. It's measured off the image --

A. Of the diffraction -- diffraction pattern when you run the program, yes.

Q. Okay. So it's measured by the program, not somebody -- a human being with a ruler?

A. Not anymore.

Q. Okay. Used to be manual?

A. Old days, yes.

Q. Okay.

A. When you actually took a negative and every TEM lab had a dark room. And thank goodness those days are over.

Q. Can you provide me a reference in the scientific literature that permits the identification of an asbestos type strictly by an EDS -- sorry -- SAED pattern? Strike that. Let me ask that better.

Can you provide me a reference in the published literature -- in the scientific literature that sanctions identifying an asbestos simply by a single axis SAED pattern?

A. I think we already talked about that. I'm not sure any scientific literature would say if

you're only handed the information from one zone axis diffraction pattern without the rest of the information -- if you have a good zone axis and it matches, you may be able to do the calculation.

So one zone axis -- you might be able to do that if you're looking at between two different minerals, say, a monoclinic versus an orthorhombic.

If you have no information whatsoever, I don't know. I don't know if you could do it with just one. I'd have to see.

Q. Okay. The Mineral Powder Diffraction File Data, is that a book I can go out in the library and get?

MR. CIRSCH: Object to form.

THE WITNESS: I imagine, if it's only an engineering library or a library at a university. You can order it online.

Q. (By Mr. Chachkes) Okay. It's generated by somebody outside of MAS?

A. No, this is not an MAS book. This is the Mineral Powder Diffraction File Data Book. There's an international standard for these types of cards for the crystalline structure information.

Q. Okay. What's the d-spacing for talc?

A. I don't know.

14:41:17 **Q.** Is the d-spacing for talc within the
14:41:22 ranges we see here for -- in your chart for regulated
14:41:26 asbestos?
14:41:26 **A. It's been a while since I've calculated**
14:41:30 **it, so I'd have to look that up.**
14:41:33 **Q.** Why do you only have amphiboles in your
14:41:41 reference chart?
14:41:46 MR. CIRSCH: Object to form.
14:41:47 THE WITNESS: Because this is the 0-degree
14:41:50 amphibole diffraction pattern table.
14:41:53 **Q.** (By Mr. Chachkes) So are you assuming
14:41:56 going into looking at the SAED pattern that you're
14:41:59 looking at an amphibole, or you're saying the
14:42:02 amphibole patterns that you're looking at could
14:42:04 only -- the patterns you're looking at could only be
14:42:06 amphiboles?
14:42:07 **A. There's no serpentine materials in here.**
14:42:12 **We've never measured chrysotile -- ever detected**
14:42:15 **chrysotile asbestos in any of the TEM analysis**
14:42:17 **because of the heavy liquid density separation.**
14:42:21 **And we don't go in blind or in a vacuum**
14:42:24 **when we do this. The chrysotile diffraction patterns**
14:42:29 **are very unique; the morphology is very unique. So**
14:42:33 **when we have amphiboles, we have a different chart.**
14:42:36 **Q.** And again -- strike that.

14:42:44 I think I already asked this question, I
14:42:48 apologize if I'm asking it twice, but there are
14:42:51 nonamphiboles that have d-spacing within the ranges
14:42:53 we see in this chart, that is, crystals that are
14:43:00 nonamphiboles?
14:43:00 **A. Most amphiboles will have d-spacings in**
14:43:03 **this range.**
14:43:04 **Q.** My question is are there crystals that
14:43:08 aren't amphiboles and aren't serpentine that have
14:43:11 d-spacings in this range?
14:43:13 MR. CIRSCH: Object to form.
14:43:14 THE WITNESS: Nonamphiboles, not that I'm
14:43:16 aware of.
14:43:16 **Q.** (By Mr. Chachkes) For example, are there
14:43:17 any phyllosilicates that have d-spacing in these
14:43:21 ranges?
14:43:21 **A. I don't believe so.**
14:43:22 **Q.** Okay. You're stating to within a degree
14:43:25 of scientific certainty there aren't any --
14:43:28 MR. CIRSCH: Object --
14:43:28 THE WITNESS: When I say I don't believe
14:43:29 so, I don't think I hold that within a
14:43:32 reasonable degree of scientific certainty.
14:43:33 Again, I'm not looking at this in a
14:43:36 vacuum. If you have the amphibole d-spacing,

14:43:39 you have the appropriate chemistry. In these
14:43:41 cases they did zone axis for these particular
14:43:44 samples, for these two samples, so zone axis for
14:43:52 1 and 2.
14:43:55 So, you know, I don't know how many
14:43:58 nonamphiboles are out there, but there's nothing
14:44:02 that I'm aware of if you're looking at all the
14:44:04 appropriate information and not looking at this
14:44:07 in a vacuum. None of this has ever -- you've
14:44:10 got to understand, none of this is ever done in
14:44:12 a vacuum. It's coupled with the chemistry,
14:44:14 coupled with the morphology, and also we have a
14:44:16 pretty good idea of what kind of matrix it's in.
14:44:20 **Q.** (By Mr. Chachkes) Okay.
14:44:21 **A. It's cosmetic talc.**
14:44:22 **Q.** So, I'm sorry, the methods you use to
14:44:26 identify asbestos are -- there's TEM, there's XRD,
14:44:34 and there's PLM. Are those the three, the big three?
14:44:38 **A. Those are the -- really the only ones**
14:44:41 **is -- yeah, XRD is used, but the big two are TEM and**
14:44:47 **PLM.**
14:44:47 **Q.** Okay. So is there anything in the
14:44:52 published scientific literature, peer-reviewed, that
14:44:55 says you can take an analysis under each of TEM, XRD,
14:45:00 and PLM, none of which conclusively point to a

14:45:04 regulated asbestos, but together you can determine
14:45:07 that it's a regulated asbestos?
14:45:09 MR. CIRSCH: Object to form.
14:45:10 THE WITNESS: Well, you're wrong about
14:45:18 this. XRD cannot point to anything. Can't tell
14:45:21 you if it's fibrous or not.
14:45:24 Polarized light microscopy by itself can
14:45:26 tell you if you have regulated asbestos.
14:45:29 Transmission electron microscopy itself can tell
14:45:31 you if it's regulated asbestos.
14:45:34 Both techniques have their strengths and
14:45:38 their weaknesses. This type of analysis, in my
14:45:41 opinion, needs the suite of techniques: the PLM,
14:45:48 the Blount PLM, and TEM.
14:45:51 For Vermont and Italian talc, I don't
14:45:54 think XRD serves any useful purpose.
14:45:56 **Q.** (By Mr. Chachkes) Okay. Let's just ask
14:45:58 the question again.
14:46:00 Now, the assumption of the hypothetical is
14:46:02 that your TEM result independently does not
14:46:07 conclusively point to a regulated asbestos, that your
14:46:11 XRD independently, that is, independent of the other
14:46:14 analyses, does not conclusively point to a regulated
14:46:17 asbestos, and that your PLM, similarly, independently
14:46:20 does not point to a regulated asbestos.

Can those three together conclusively point to a regulated asbestos --

MR. CIRSCH: Object to form.

Q. (By Mr. Chachkes) -- each one making up for the other's defects, in a way?

MR. CIRSCH: Object to form.

THE WITNESS: Well, there's no defects like you state. I can't answer a question where you're saying if all three are negative or nondetects, because it's either nondetect or you have identified the regulated asbestos.

So if you're telling me I have three nondetects, then, no, I can't point to any regulated asbestos in three nondetects.

Q. (By Mr. Chachkes) Okay.

A. Before you start, we've been going over an hour. Can we go off the record?

Q. Can I maybe ask a couple more questions on the same line, and I'll finish it up, if that's okay?

A. If you insist.

Q. I don't do this that often but --

A. That's fine.

Q. It's fascinating science.

Okay. So we agreed that the single zone axis SAED pattern in a vacuum didn't point to

asbestos, right, even though you're saying it's asbestos; right?

MR. CIRSCH: Object to form.

THE WITNESS: I don't think we agreed to that. It depends on the zone that you get. If you were to sit down and just look at that by itself, a 302, you could probably eliminate a lot.

But based with all the other information, if the zone axis -- if you're getting a zone axis, that means you have something that you got a zone axis off of.

Q. (By Mr. Chachkes) Right.

A. But you're asking this hypothetical in a vacuum. That's not what we do. I can't -- I've not sat down and tried since graduate school where they give you a mineral and just give you XRD pattern and say go identify it. It's not something that we would ever do for any of these analyses without the morphology and without the chemistry.

Q. Okay. Last question. I'll ask it one more time because I don't think I've gotten the answer. If you want to give the same answer, it's fine, but I'm giving you the opportunity to answer this.

If I had a single crystal, I had a TEM analysis that in a vacuum could point to many things, not just asbestos, an XRD that could point to many things, not just asbestos, and in a vacuum PLM that could point to many things, not just asbestos, is there any published peer-reviewed literature that I can look at that says that's a situation where you can combine the three and say that indeed is asbestos?

MR. CIRSCH: Object to form.

THE WITNESS: I can't answer a hypothetical that would never happen in a working real lab that does this analysis. You wouldn't sit there and go, I've run these three and I have no clue what it is, now I'm going to combine it all together and say, gee, that's going to tell me.

I can't answer that hypothetical. Somebody else will have to wade through that one.

MR. CHACHKES: Okay. Let's take a break.

THE WITNESS: Thank you.

(Recess from 2:49 p.m. to 3:07 p.m.)

Q. (By Mr. Chachkes) So Dr. Longo, in your diffraction verification documents, sometimes the

bottom -- that's not a good example.

Let's look at Exhibit 16, and let's look at the first verification page. Sometimes in the lower left, as we discussed, the zone axis information is just not -- there's nothing filled in there; right?

A. Correct.

Q. If it's blank, does that mean that this particular image was not taken at a zone axis?

A. That is correct.

Q. Does MAS maintain nonasbestiform reference samples for tremolite?

A. Well, yes and no. Most -- tremolite standard has both. If you go to the one I brought -- and when we say nonasbestiform, we're saying it's not meeting the 5-to-1 aspect ratio. That's less. It certainly still could be asbestiform since it's fibrous, but those we do not count in our analysis using the TEM protocols, which are the standard methods for scientists to identify asbestos. And you can understand, these protocols are all heavily vetted and peer-reviewed.

For example, my ASTM D5755 method took six years to get it through the 125 scientists. And all these methods have been published in the

peer-reviewed literature since any time anybody publishes anything on the measurement of asbestos, they will reference one of these protocols.

Q. Do you remember what my original question was? So the question was do you have -- so let's make it easier.

Do you have a bottle of nonasbestiform tremolite at MAS?

MR. CIRSCH: Object to form.

THE WITNESS: I'm not sure a bottle of nonasbestiform tremolite actually exists. You typically find both. Somebody may call it nonasbestiform; but when you go look through it, or they say it's asbestos, you'll find structures that are less than the 5-to-1 aspect ratio. We don't count those.

Q. (By Mr. Chachkes) Do you have a bottle at MAS of nonasbestos -- of tremolite where, on average, its aspect ratio is below 5-to-1?

MR. CIRSCH: Object to form.

THE WITNESS: I'm not sure any such thing exists. We don't have what doesn't exist.

Q. (By Mr. Chachkes) Okay. Do you have a bottle in your office of anthophyllite where the aspect ratio of the anthophyllite is all underneath

5-to-1?

MR. CIRSCH: Object to form.

THE WITNESS: No. You have them that have a range of aspect ratios, less than 5-to-1, greater than 5-to-1. The average is typically above 5-to-1.

Q. (By Mr. Chachkes) Okay. So you don't have a bottle in your office of an amphibole that has aspect ratios averaging under 5-to-1?

MR. CIRSCH: Object to form.

THE WITNESS: No. All the bottles with standards we have are actual asbestos, but they do have a portion that are below 5-to-1.

Q. (By Mr. Chachkes) And that's because it's a big bell curve and some of that bell curve is over on the less than 5-to-1 and some of it is on the right?

A. **That's correct. The NIST standard for tremolite, I think the average -- even with the less than 5-to-1, greater than 5-to-1, is around 10.**

Q. Is your opinion that there's literature supporting your position that you always find both asbestiform and nonasbestiform amphiboles together?

A. **I believe so.**

Q. Can you tell me --

A. **I can't tell you right now. I mean, sometimes I anticipate cross-exam -- you know, discovery depositions, but I'm not aware of any that somebody states this is all, quote, nonasbestiform or all cleavage fragments.**

Q. Okay.

A. **What I see -- and I'll have to dig it up -- is that if you have one, you have the other.**

Q. And you don't cite any such literature in your expert report, do you?

A. **No, sir, I'm not making the claim that -- what I'm doing in my expert report is saying here's what we measured using the standard TEM, well-vetted protocols for the identification of regulated asbestos.**

Q. Do you remember the question was about whether --

MR. CIRSCH: I don't know if he finished the answer yet.

Q. (By Mr. Chachkes) Yeah. Do you remember the question?

MR. CIRSCH: I --

THE WITNESS: I remember --

THE REPORTER: One at a time.

THE WITNESS: I remember the question, but

the answer is it's not something that I was relying on for my identification of regulated asbestos. I'm relying on the peer-reviewed publications for the standard TEM methods and standard PLM methods.

Q. (By Mr. Chachkes) Do you have a standard in your lab of an SAED readout for an amphibole with ratios of less than 5-to-1 aspect ratios?

MR. CIRSCH: Object to form.

Q. (By Mr. Chachkes) So I'm not asking whether you have incidentally such a thing but a standard that you use to compare against?

A. **Well, no, there's nothing to compare. The less than 5-to-1 aspect ratio versus greater than 5-to-1 aspect ratio will have the identical d-spacings and identical diffraction patterns. There's no difference in a, quote, less than 5-to-1 and greater than 5-to-1. You just will have the exact same type of patterns for d-spacing, and if you were to do a zone axis, you'll have the same zone axis.**

Q. Okay. So it's your opinion that for SAED, a single nonasbestiform tremolite crystal and a single asbestiform tremolite crystal will have the same SAED patterns?

MR. CIRSCH: Object to form.
THE WITNESS: Yes.
Q. (By Mr. Chachkes) Okay. Is the same true for EDXA?
A. It is.
Q. Is the same true that the PLM will look the same for an asbestiform fragment and a nonasbestiform fragment of tremolite?
A. Well, let's be clear. I'm not calling it asbestiform and nonasbestiform. I'm calling it -- for the 22262-1, it's materials that are less than 3-to-1 aspect ratio. They'll have the same refractive indices, same information.
There's no difference in the crystalline structure between what's less than 5-to-1 or less than whatever the aspect ratio is for a particular method that you're using. There's no difference.
That's how you either count greater than or equal to 5-to-1 aspect ratio for TEM. Or in the PLM we're looking at bundles that typically are -- I think all of them were -- the individual fibers and the bundles were greater than 20-to-1.
Where we draw the line is in the method when it says anything less than 3-to-1 is not counted. And that's what we do. We call them

cleavage fragments.
Q. Have you ever heard anyone distinguishing asbestiform and nonasbestiform tremolite by virtue of whether it has parallel fibers?
MR. CIRSCH: Object to form.
THE WITNESS: Yes. If it is a bundle, by definition, it is asbestiform. Both Ann Wylie and both the 22262-1 and the R-93 as well as -- and TEM's different. You take the overall aspect ratio of a bundle width to length. That's how we distinguish between a regulated asbestos fiber and not. But even in TEM, if it is a bundle, hence it is asbestiform.
Q. (By Mr. Chachkes) Okay. Would the SAED pattern for tremolite with parallel fibers and tremolite that does not exhibit parallel fibers be the same?
A. Yes.
Q. Okay. Same --
A. For the right orientation, same orientation, yeah. Yes.
Q. What about on all three orientations?
A. I haven't done it on all three orientations because we don't count those if it has less than the counting aspects, and we typically only

do d-spacings following the peer-reviewed published protocols.
Q. Okay. Do you have any opinion on whether a tremolite with parallel fibers and a tremolite that does not have parallel fibers would indeed have identical d-spacings on all three axes for SAED?
A. We haven't done three-axis SAEDs for something that is not counted as a regulated asbestos fiber. Single individual fibers will have the same d-spacing range, will have the same selected area electron diffraction zone axis if you go to the particular orientation.
Q. So I'm going to ask again because my question's only about -- it's not about what you've done, it's about what something looks like.
Does the SAED for tremolite that has parallel fibers look exactly the same on three axes as a tremolite that does not have parallel fibers?
MR. CIRSCH: Object to form.
Q. (By Mr. Chachkes) Putting aside whether you've done it or not, as a matter of science, are they the same? You can say you don't know, but I need that question answered.
MR. CIRSCH: Object to form.
THE WITNESS: It should be the same. But

it's not something that we do, because it's not part of the peer-reviewed published standard protocols. When it is -- when it is not parallel sides or it doesn't meet the 5-to-1 aspect ratio, it is not recorded.
Q. (By Mr. Chachkes) Do you know of any published literature that confirms that they should be the same?
A. It's not -- I believe so, yes.
Q. What?
A. Again, it has to do with surface charts. I don't recall the citation.
Q. Okay. Sitting here today you can't give me a citation for that?
A. No, sir, I did not anticipate that we were going to be debating non -- debating asbestos minerals that we don't count or don't put into our report.
Q. Okay. What about under PLM, does a tremolite that has parallel fibers look the same under PLM as a tremolite that does not have parallel fibers?
A. No.
Q. What about TEM when you're looking at just morphology, do the two look the same?

15:20:18 **A. If it's not parallel, it's not going to look the same. If it's PLM and you can't see the individual fibers in the bundles, it's not going to look the same.**

15:20:25 Q. Okay. Do you have a standard reference standard for PLM for tremolite that does not have parallel fibers?

15:20:36 **A. And again, I guess we're going back to a bottle of cleavage fragments. No. But we do routinely see tremolite/actinolite cleavage fragments that are less than 3-to-1 aspect ratio that is recorded in -- and they have the same properties that give us the refractive indices and identification. Otherwise, you wouldn't be able to identify it.**

15:20:59 Q. Do you have a standard TEM photograph showing morphology that is for tremolite that does not exhibit parallel fibers?

15:21:12 **A. I don't know if we have recorded typical nonparallel sides on a TEM structure that has the same chemistry, but we do not record any of our analyses as per the peer-reviewed published protocols.**

15:21:30 Q. Okay. Would your answers be the same for anthophyllite?

15:21:36 **A. It would be the same.**

15:21:38 Q. Okay. For all those questions whether you keep the separate standard?

MS. O'DELL: Object to the form.

15:21:44 THE WITNESS: If -- we don't keep a separate standard because we do not record amphibole structures that have the same chemistry, same diffraction pattern types, that are not part of the counting protocols for these peer-reviewed protocols for the analysis.

15:22:01 Q. (By Mr. Chachkes) Taking you back to your November reports, your November 14 reports, it's my understanding that in it you confirmed that -- that in it you confirm that the SAED confirmed regulated asbestos; is that correct?

MR. CIRSCH: Object to form.

15:22:36 THE WITNESS: We confirmed that the -- I don't believe we said it like that. What we confirmed is following the peer-reviewed published protocols, either for TEM or polarized light microscopy using the methodology that takes you through the steps to determine if it's regulated asbestos, primarily the counting rule, the chemistry, and the crystalline structure. That's why they have all three. None of this is done in a vacuum. That's what we did.

15:23:11 Q. (By Mr. Chachkes) Let me just ask you the straight question. Did your November report confirm that SAED patterns confirmed regulated asbestos in J&J bottles of talc?

MR. CIRSCH: Object to form.

15:23:25 THE WITNESS: I'd have to see the context because it has to be all the information that's done. Regulated asbestos goes with the counting rules, that's the first -- counting rules on the structure, parallel sides, the diffraction pattern, and the chemistry. That's how the protocol says to do this. Not just an SAED by itself, not an EDS by itself, and not the morphology by itself. You have to use all three for TEM analysis. That's how the protocol goes.

15:24:03 MR. CHACHKES: Okay. Let me ask you in this way. Let's mark this next exhibit.

(Defendants' Exhibit 18 was marked for identification.)

15:24:23 Q. (By Mr. Chachkes) So can you confirm that Exhibit 18 is one of your SAEDs?

15:24:29 MR. CIRSCH: On the back of here I see some -- okay.

MS. TROVATO: On the back -- sorry.

MR. CHACHKES: Here. Take mine.

15:24:32 MR. CIRSCH: I wanted to make sure that you --

15:24:38 Q. (By Mr. Chachkes) So can you confirm Exhibit 18 is of your SAED patterns?

15:24:46 MS. O'DELL: Would you direct us? Is there a specific page in his November report that you're referring to?

15:24:50 THE WITNESS: I see it right here. It's the M68233-001-001, which matches the M number and fiber number. It says that we -- date of photo was 2/14/2018. So that is one of our diffraction patterns.

15:25:10 Q. (By Mr. Chachkes) Okay. Does this confirm that there is anthophyllite in J&J talc, Exhibit 18 alone?

15:25:23 **A. You keep saying alone, and you keep saying in a vacuum. That's not how it's done. The methodology doesn't say take the SAED alone. We have the chemistry that goes with it and the morphology. There's a reason it takes you through those steps.**

15:25:39 Q. Okay. So the question is does Exhibit 18 alone confirm anthophyllite?

15:25:49 MR. CIRSCH: Object.

Q. (By Mr. Chachkes) It's just yes or no.

15:25:50 MR. CIRSCH: It's not yes or no.

THE WITNESS: It's not yes or no. It's -- again, my answer is you do not look at these patterns alone. You're using a peer-reviewed published protocol that walks you through morphology, EDXA, and a diffraction pattern. That's how the protocol goes.

It's not my protocol. These are the protocols for the ISO methods, for the AHERA methods, the ASTM -- TEM methods. There is a reason you do all of them.

Q. (By Mr. Chachkes) Right. So it's my understanding that this is an answerable question. If you say it's completely unanswerable, tell me. And I understand you don't like it when I've asked you about something in a vacuum, but the question stands. In a vacuum, Exhibit 18, is that a uniquely anthophyllite pattern?

MR. CIRSCH: Object to form. That's been asked and answered.

THE WITNESS: And my answer stands.

Q. (By Mr. Chachkes) Okay. And that answer's what? If you're not going to answer, just tell me.

MS. O'DELL: He's already answered.

MR. CIRSCH: He's already answered the

question.

THE WITNESS: My answer stands. The previous answer.

Q. (By Mr. Chachkes) Okay. Now, I'm looking at Exhibit 17, which I believe corresponds to this; right?

A. Yes.

Q. Okay. Page 1 of the -- the first verification, it shows date verified as 2/14. Do you see that?

A. Correct.

Q. That means on the same day of the photo you actually put this picture into the software to determine the d-spacing; correct?

A. That's correct.

Q. Okay. For many of the SAED patterns that have been produced in this case, the verification came after your November report; correct?

A. That's correct.

Q. Some of them came after -- came as late as January; right?

A. That may be possible.

Q. Okay. So you were using, for the purposes of at least the November report, some of the EDSA patterns you had not run d-spacing on?

MR. CIRSCH: Object to form.

THE WITNESS: That's correct. Well, we had taken the data, and the photograph was taken. You know, when the verification came through, it may have been done later.

Q. (By Mr. Chachkes) Yeah, and I might have misspoke.

So what I'm saying is that for some of the samples in the November report, you had not run the d-spacing for the SAED; is that correct?

A. That's possible.

Q. Okay. Is the d-spacing important to determining whether SAED is pointing towards a regulated asbestos?

MR. CIRSCH: Object to form.

THE WITNESS: It's all important. If you do this long enough, you can look at it and say that's an amphibole diffraction pattern. But the verification just solidifies it.

Q. (By Mr. Chachkes) Okay. Why did you run verifications after your first report and as late as January for SAED verifications?

MR. CIRSCH: Object to form.

THE WITNESS: Because they've all been taken, just getting to them. Certainly if it

didn't verify it, then we'd have something else to talk about today.

Q. (By Mr. Chachkes) How many particles did your analyst conduct zone axis determinations on?

MR. CIRSCH: Object to form.

THE WITNESS: How many fibrous structures?

Q. (By Mr. Chachkes) Yes.

A. I haven't counted them up.

Q. Could it be about a dozen?

MR. CIRSCH: Object to form.

THE WITNESS: Again, I haven't counted them up.

Q. (By Mr. Chachkes) Okay. And earlier we talked about how it's difficult to distinguish talc and anthophyllite with EDXA; right?

MR. CIRSCH: Object to form.

THE WITNESS: I didn't say it was difficult. What I said was you would not identify it by just EDXA. You would use the procedures in place, all the procedures, to make that determination if you have fibrous talc versus anthophyllite.

Q. (By Mr. Chachkes) And when you say all the procedures, you mean procedures above and beyond EDXA?

A. Procedures that are stated in the peer-reviewed protocols that we use.

Q. That are above and beyond EDXA?

MR. CIRSCH: Object to form.

THE WITNESS: Well, they're all above and beyond EDXA. None of this is done in a vacuum. No analyst is just looking at the EDXA and not following the protocols as published in the peer-reviewed literature for making these determinations.

Q. (By Mr. Chachkes) You were saying that a way to tell the difference between talc and anthophyllite in SAED is to tilt the goniometer --

A. Goniometer.

Q. -- goniometer; is that right?

A. That's correct.

Q. Okay. In every instance -- are there instances where you looked at a particle for a J&J sample in the MDL and tilted the gon --

A. Goniometer.

Q. -- goniometer and determined, oh, well, that's talc?

A. That's certainly possible.

Q. Okay. Is it that you don't know because your analyst would have done it and not reported that

to you?

MR. CIRSCH: Object to form.

THE WITNESS: Well, we were only taking a random talc verification of some of these for one fiber, it's at the end of the -- each of the analyses where there was fibrous talc present in the TEM, there is an SAED, EDS, and a picture showing the morphology.

These particular ones are not talc. These are zone axis. This happens to be the historical 1978 that was produced through Lanier, and these zone axis orientations are not what the so-called look-alike zone axis for the talc fiber.

Q. (By Mr. Chachkes) I'm sorry, you're saying that what's in Exhibit 17 are non-MDL samples?

A. No, it is an MDL sample. I said it is an MDL sample.

Q. Oh, okay. When you said produced through Lanier, I didn't understand what you meant there.

A. Well, it went to Lanier and went to us.

Q. Okay.

A. The 1978 --

Q. Got it.

A. -- two samples for one container. I think

it's JBP-084.

Q. Earlier we talked about how cummingtonite and anthophyllite have the same chemistry; do you remember that?

A. Yes.

Q. One way to tell them apart is to determine the crystal system of the particle?

A. Correct. You could go in and do zone axis and get a monoclinic versus the orthorhombic.

Q. Okay. So anthophyllite is orthorhombic, and cummingtonite is monoclinic?

A. That is correct.

Q. Okay. Did you do the analysis to determine whether what you were looking at and thought might be anthophyllite to see whether it was monoclinic and thus cummingtonite?

A. No, we don't do that. We just call it the anthophyllite solid solution series since both anthophyllite, cummingtonite, and grunerite are regulated asbestos.

Q. Okay.

A. There's no -- unless you want to do that for some reason, there's no need to go any further.

Q. Okay. So everything in your expert report that you identify as anthophyllite could very well be

cummingtonite, but your position it doesn't matter?

MR. CIRSCH: Object to form.

THE WITNESS: Well, everything could be anthophyllite and it still doesn't matter. You know, if you use the analogy, well, I found the weed and it's a particular weed that is a problem and we need to get rid of it, now I want to go look and see what color roots it has because the weed itself all looks the same.

This particular one, these zone axes are anthophyllite for, I believe, in these two -- this was the one that Dr. Sanchez says was cummingtonite, and so we went back and did zone axis just some time ago. And actually, these two structures are in fact anthophyllite.

Q. (By Mr. Chachkes) You mean you do zone axis to determine whether it was orthorhombic or monoclinic?

A. Well, we did zone axis to make sure that it was orthorhombic and had the reflections, that it had the crystalline orientation specific for orthorhombic anthophyllite.

Q. Did you produce the material that shows that sample to be orthorhombic?

A. Number 17.

15:34:37 **Q.** That's number 17? Okay.
15:34:40 **A.** **The first one, especially. I know for the**
15:34:42 **301.**
15:34:44 **Q.** And for the other -- it's fair to say that
15:34:50 most of the particles in this case that you've
15:34:52 identified as anthophyllite could very well be
15:34:55 cummingtonite, but you didn't make the distinction?
15:34:59 MR. CIRSCH: Object to form.
15:34:59 **Q.** (By Mr. Chachkes) Putting aside whether
15:35:01 it matters or not.
15:35:02 MR. CIRSCH: Object to form.
15:35:03 THE WITNESS: Well, most of these
15:35:06 elongated particles, these asbestiform bundles,
15:35:10 could be anthophyllite --
15:35:11 **Q.** (By Mr. Chachkes) The ones --
15:35:12 MR. CIRSCH: Hold on.
15:35:13 THE WITNESS: -- versus cummingtonite.
15:35:15 But it's a difference without any consequence.
15:35:18 They're both regulated asbestos.
15:35:19 **Q.** (By Mr. Chachkes) Right. Putting aside
15:35:21 the difference, okay -- this is just a question that
15:35:25 should be very simple -- most of the part -- except
15:35:28 for the one you went back and verified whether it was
15:35:31 orthorhombic, most of the particles you identify in
15:35:34 your report could either be -- that you identify as

15:35:37 anthophyllite could either be anthophyllite or
15:35:39 cummingtonite, putting aside whether it even matters;
15:35:42 is that a correct statement?
15:35:43 MR. CIRSCH: Object to form.
15:35:44 THE WITNESS: No. You don't know if most
15:35:46 of the particles could. It could be this, it
15:35:48 could be that. It could be mostly all
15:35:50 anthophyllite.
15:35:52 You know, you think it's all
15:35:54 cummingtonite. But you're right, it doesn't
15:35:55 matter because I identified them as the
15:36:01 anthophyllite solid solution series.
15:36:02 **Q.** (By Mr. Chachkes) Okay. Is there
15:36:03 literature calling cummingtonite part of the
15:36:05 anthophyllite solid solution series?
15:36:05 **A.** **Lots of it.**
15:36:05 **Q.** Okay. Can you cite one for me? Let's
15:36:10 start with this. Any cited in your report?
15:36:11 **A.** **Yes.**
15:36:12 **Q.** Okay. Can you --
15:36:14 **A.** **Can I show it to you?**
15:36:16 **Q.** Yes, show it to me.
15:36:18 **A.** **And I produced it in other J&J.**
15:36:37 **It's easier for me just to look through**
15:36:41 **the references and find it for you.**

15:36:43 **Q.** That's okay. That's fine. We'll just
15:36:44 leave it as is.
15:36:45 **A.** **I belive it's -- let me just make sure**
15:36:46 **it's in here.**
15:36:55 **It's reference 23, Manual of Mineralogy,**
15:36:58 **21st Edition, Revised, Cornelis Klein and**
15:37:04 **Cornelius S. Hurlbut, Jr., from John Wiley & Sons,**
15:37:07 **and it's on page about 256, if I remember correctly.**
15:37:11 **Q.** Okay. What other mono -- okay.
15:37:15 If your EDS doesn't tell you whether -- if
15:37:19 you haven't determined whether what you're looking at
15:37:21 is orthorhombic or monoclinic, are there any other
15:37:24 minerals that they could be that are indeed also
15:37:28 monoclinic?
15:37:29 **A.** **No. Not after we do the full suite of**
15:37:31 **analyses. It's one of these regulated asbestos types**
15:37:34 **for the anthophyllite solid solution series.**
15:37:34 **Q.** Okay.
15:37:37 **A.** **These have been identified to the degree**
15:37:42 **necessary to make that statement.**
15:37:43 **Q.** Okay. Just -- and we're going to ask a
15:37:45 question in a vacuum, and I understand all your
15:37:48 objections to answering questions about science in a
15:37:50 vacuum, but it's important to us.
15:37:53 If you have an SAED pattern where you

15:37:56 didn't determine whether it's orthorhombic or not,
15:38:00 just looking at that pattern, in a vacuum, without
15:38:03 your other information, is it possible -- can you
15:38:08 exclude -- is it possible that correlates to any
15:38:12 other monoclinic minerals?
15:38:14 MR. CIRSCH: Object to form.
15:38:15 THE WITNESS: I've already answered this
15:38:16 question.
15:38:16 We don't look at it in a vacuum. You're
15:38:18 asking me to look at things in a vacuum that are
15:38:21 not part of the peer-reviewed published
15:38:25 identification protocols for asbestos.
15:38:27 That's what we do. We look at and follow
15:38:29 the procedures that are in the protocols. So
15:38:33 when we do this analysis, especially for
15:38:36 anthophyllite, we're looking at morphology,
15:38:38 we're looking at chemistry, and we're looking at
15:38:40 selected area electron diffraction.
15:38:43 **Q.** (By Mr. Chachkes) So --
15:38:43 MR. CIRSCH: Hold on.
15:38:44 THE WITNESS: And that's my answer.
15:38:45 **Q.** (By Mr. Chachkes) So you understand I'm
15:38:46 allowed to ask questions that aren't specifically
15:38:49 correlating to something in a regulation; right? I
15:38:51 can ask about general science. You understand that;

right?

MR. CIRSCH: Object to form. He can give you an answer --

Q. (By Mr. Chachkes) Yes or no?

MR. CIRSCH: -- he thinks is appropriate.

Q. (By Mr. Chachkes) It's a yes or no question.

A. Well, yes, you can ask any question you want. But, no, I don't think it's appropriate to ask questions that is not part of how we identify and ask in a vacuum. So my answer stands.

Q. Okay. So I'll ask you again, and if you don't want to answer, you can give me the same circular answer, but I'm going to ask you again.

MR. CIRSCH: Object to the commentary on the record, Alex. There's a lot of it.

Q. (By Mr. Chachkes) If the -- looking at -- if you haven't determined whether something is orthorhombic or not, looking at the SAED pattern in a vacuum, could it correspond to other minerals besides cummingtonite and anthophyllite?

MR. CIRSCH: Object to form.

THE WITNESS: That's not how we have done this analysis for every one of these samples that we're dealing with in TEM, for the 100,

almost 200 fibers and bundles that we've identified. We have used the peer-reviewed standard published protocol specifically to identify regulated asbestos. We didn't look at anything in a vacuum. We don't do that.

Q. (By Mr. Chachkes) Okay. Putting that aside, this is just a matter of EDSA science. EDSA science tells me that Exhibit 18 looked at in isolation could correspond to many minerals; right?

MS. O'DELL: Objection.

Q. (By Mr. Chachkes) Just EDSA science?

A. Again, we're not dealing with many minerals. We're dealing with regulated asbestos in a talc deposit that has the ability to form these billions of years ago under temperature and pressure. We're using protocols that are specifically designed to identify regulated asbestos. And that's what we do.

Q. Okay.

A. Asking things in a vacuum or hypotheticals is not what we did.

MR. CHACHKES: Okay. How much time do we have left on the tape?

THE VIDEOGRAPHER: 17.

MR. CHACHKES: Why don't we just swap out

the tape and we don't have to take a break.

(Recess from 3:41 p.m. to 4:01 p.m.)

Q. (By Mr. Chachkes) Dr. Longo, the court reporter informed me that a couple of times I mispronounced EDXA as EDSA. Did you understand when I said EDSA to mean EDXA?

A. Yes. Energy dispersive spectroscopy analysis is also well known.

Q. Okay.

A. People have different acronyms for it, so it's fine. I think I was repeating what you were saying.

Q. Okay. So is it your position that reporting analytical sensitivity by weight percent does not provide any useful information for determining potential airborne exposure to asbestos structures?

A. Yes.

Q. Is it your position that structures per gram data is the most useful for potential airborne exposure?

A. Yes.

Q. And in your report, in support of that proposition, you cite ISO 10312; correct?

A. Correct. And it's in both of the ISO

methods.

Q. Okay. ISO 10312 is a method for detecting asbestos in ambient air; correct?

A. Correct.

Q. Have you ever conducted air testing pursuant to the ISO 10312 method?

A. In the past, yes.

Q. Okay. How many times?

A. I don't know.

Q. Over ten?

A. I don't know.

Q. Over one?

A. Most likely over one, but how big the bread box is, I don't know.

Q. Okay. Did you test anything under the ISO 10312 method for this case, the MDL?

A. Well, if you look at our report, we have referenced a number of TEM methods for the counting rules, including the two ISO methods, the ASTM method, the AHERA method. They all have the same counting rules for the determination of a regulated asbestos fiber. The ISO methods are referred back to in both the 22262-1 and -2 as the counting criteria for fibers and bundles.

Q. Did you do an ISO 10312 ambient air test

for the purposes of this MDL?

A. No.

Q. And this ISO method involves collecting air samples and testing for fibers; correct?

A. Correct.

Q. And you're not testing ambient air fibers in this case, in this expert report?

A. No, we're not testing ambient air. But you have to understand once the asbestos gets on the filter, the -- and I know it sounds silly, but the asbestos fibers don't know if it came out of ambient air, if it came out of a water sample, came out of a dust sample, or it came out of a bulk sample like cosmetic talc. What's most important is the counting rules that are the same for all these different methods, as in the ISO 22262-2 for the TEM analysis of talc.

Q. You did not conduct an exposure assessment for this case, did you?

A. I haven't conducted an exposure assessment with any MDL samples.

Q. You did employ ISO 22262; correct?

A. Yes.

Q. That does not include a formula for reporting of data as structures per gram; correct?

A. That's correct.

Q. The --

A. Well, that's not quite true. If you go to the ISO TEM method that it references, it shows you how to report it in fibers or bundles per gram. So again, you have to look at the methodology that it references.

Q. Okay. So let me -- which ISO, 1, 2, 3 -- can you tell me -- are you referring to?

A. It's the 137 --

Q. ISO -- so it's part 1; correct?

A. Well, it's in both. It's in part 1 and part 2.

Q. Okay. So can you point to me in part 2 where -- and that's Exhibit 3 -- where it says -- that proper reporting is done in structures per gram?

A. Did you mark that as an exhibit?

Q. Exhibit 3, yeah. It's going to be down from the beginning.

A. It's 1. Give me a second. I will in a second. I'm sure it's in this pile.

MR. CIRSCH: It might be there.

THE WITNESS: There it is.

Q. (By Mr. Chachkes) It should be Exhibit 3. Okay.

A. So if you go to 16 --

MR. CIRSCH: You're calling it Exhibit 3, but it says on here Exhibit 5. I just want to make sure that --

MR. CHACHKES: So Exhibit 3 should be ISO-2?

MR. CIRSCH: It's got Exhibit 5 on it.

Q. (By Mr. Chachkes) I'm sorry, I'm reading my number wrong -- strike that. My 3 looked like -- totally my fault.

All right. Before you is Exhibit 5, which is part 2 of the ISO 22262 standard. Can you point to me where it requires reporting in structures per gram?

A. If you go to 16.3, last paragraph before you get to 17, it says, If it is required to include all fiber sizes in the measurement, determination of mass fraction by TEM using 14.2.4 is the optimum analytical procedure.

If you go to 14.2.4 -- 14.2.4.4, Preparation of specimens for SEM or TEM observation, then it references back to the ISO 13794.

Q. Okay. So you -- it's your understanding that the ISO 22262 -- so first of all, the ISO 22262 -2, putting aside cross-references, itself doesn't

have a formula for reporting data as structures per gram; correct?

A. That is correct.

Q. Okay.

A. And it doesn't have the formula for calculating weight percent. It points you back to the ISO TEM protocols.

Q. Okay. And then the reference to 14.2.4, that section is entitled, Determination of asbestos weight mass fraction from fiber measurement made by PLM, SEM, or TEM.

That's the title; right?

A. Correct.

Q. Okay. I just want to do a little walk through one of the calculations you made so I can figure it out.

Can I have the exhibits? Mark this as Exhibit 19.

(Defendants' Exhibit 19 was marked for identification.)

Q. (By Mr. Chachkes) Okay. Can you tell me just on a high level what this spreadsheet, Exhibit 19, is meant to represent?

A. This represents the weight of the sample that was used, it represents the weight of the sample

analyzed per grid opening, it tells you what the filter size was, it tells you how many regulated asbestos structures, and then it gives you the calculation of how many asbestos structures per gram, which if you're doing weight percent, you have to do all the same -- get all the same information, but instead of stopping at the number of structures per gram, then you go through the calculation to determine the weight of each of the structures and then calculate a mass weight percent.

Q. Okay. So in Exhibit 19, I guess, on the upper left I see a .03135. That's the initial weight prior to concentration method, or is that after concentration?

A. That is the weight prior to the concentration method.

Q. Okay. So that's basically the unconcentrated weight that you are trying to determine how many structures are in there?

A. Correct.

Q. And you use a Sartorius scale; right?

A. That's correct.

Q. Does it have that many significant digits?

A. It does.

Q. Okay. Does it have more than that, or is

that it?

A. Let's see. One, two, three, four, five. I think it has six.

Q. Okay. But you only report five significant digits; correct?

A. Correct.

Q. And then your analysts conduct heavy liquid density separation; right?

A. Correct.

Q. After separation you have basically an amphibole sludge and with much of the talc removed?

A. Correct.

Q. And what is the percentage of talc from amphibole separation your analysts achieve in this analysis?

A. We haven't measured that.

Q. Do you have the data and just didn't put it on the sheet, or you just -- you don't even have the data?

A. We don't measure the amount that we removed.

Q. Okay. Is there a way to calculate it?

MR. CIRSCH: Object to form.

THE WITNESS: Not without making the measurement, no.

Q. (By Mr. Chachkes) If you're analyzing two samples and sample A contains more amphiboles than sample B, would you expect that following the concentration there would be more products separated out from A than B?

A. I don't know if you can measure that. If it contains more amphibole fibers in the final supernate, then you would have more fibers that you counted.

Q. And by supernate, that's kind of a synonym for amphibole sludge --

A. Well, it's the pellet. Whatever has gone down to the bottom of the centrifuge tube, any potential amphiboles, some talc particles, you always see talc particles, so it's not 100 percent efficient.

Q. The supernate's the solids that are left over after the concentration?

A. Correct.

Q. So you can't say that if one sample has more amphiboles than another that there will be more supernate in the former than the latter?

A. You would expect -- if it has more in there you would expect more, but it's pretty tough to make that determination before you measure it.

Q. Yeah, I'm not asking you for a calculation. I'm just saying just seems like common sense if you've got more to concentrate out, you'll get more concentrate.

MR. CIRSCH: Object to form.

THE WITNESS: All things being equal, that's correct.

Q. (By Mr. Chachkes) Okay. After separation you did not weigh the centrifuge that remained -- you did not weigh the supernate that remained after desiccation; correct?

A. That's correct.

Q. And I see a number, weight of sample analyzed; do you see that there?

A. Correct.

Q. That's more significant digits than in the initial weight; correct?

A. That's correct. You take the amount that has theoretically gone down onto the filter, what you start with, so that if you have 31.35, then you calculate what's on the overall filter, and then you calculate how many grid openings you look at, then it's just the math.

Q. Yeah, now my question is just about significant digits. You understand why significant

digits are important; right?

A. Yeah, but that's a mathematical determination of significant digits.

Q. Right. Significant digits are important because if I have a number with three significant digits multiplied times a number with four significant digits, the result should be reflecting the least number of significant digits that went into the equation; correct?

MR. CIRSCH: Object to form.

THE WITNESS: You can do it that way if you like, or you can put it out to the significant digits and then round it.

Q. (By Mr. Chachkes) Okay. Shouldn't you have rounded the weight of the sample analyzed because you've got more significant digits -- you've got more digits than there are significant digits?

A. No. It's a mathematical -- it's a mathematical equation or just simply dividing it on how much of the original sample would cover the filter.

Q. Okay. You've got a -- I'm going to phrase this a different way.

You've got a greater precision in your weight of sample analyzed than you do with the

precision of the numbers that went into it?

MR. CIRSCH: Object to form.

THE WITNESS: I don't think it's any more precision. It's taking the weight and dividing it onto the filter, and then from the filter you're looking at a number of area by 100 grid openings, so you're calculating what the weight would be if you put the whole -- to go back to the sample to determine the amount of fibers. That's just the way it's done.

Q. (By Mr. Chachkes) Does your Sartorius scale have the capability of measuring a sample down to .00017187 grams?

A. Not the Sartorius, but we do have a microbalance, but that's not how this is done.

Q. So the -- this is just a yes or no. The weight of sample analyzed is a number that is a calculation; right?

MR. CIRSCH: Object to form.

THE WITNESS: Yes.

Q. (By Mr. Chachkes) Okay. And the structures per gram of sample, that's also a number that's calculated; right?

A. That's correct.

Q. And what's the equation to get me the

weight of sample analyzed?

A. Well, you go back to the individual structures and you multiply the length by the width squared times the density of the particular type of amphibole times pi. And then all those are added up, and then you then go from the adding that up to what the overall weight would be on the filter.

Q. Okay. And the weight of sample analyzed is for one grid opening, ten grid openings, 100 grid openings? What is it?

A. That's, as I believe, that's one grid opening.

Q. Okay. So if you wanted to extrapolate, putting aside --

A. I may be wrong on that. I have to check that. I think it's all 100.

Q. Okay, if that's all 100. Now, that's what percentage of the total supernate?

A. We haven't measured the total supernate. We measure what we start with because the calculations go back to what you start with. We don't measure the supernate.

Q. What percentage of what you started with is it?

A. We started with 31 milligrams, and that is

0.17. Well, we started with 0.3135 grams, and that is .00017187 grams. So just divide the two.

Q. So is there any need to extrapolate here, or is 100 percent of the supernate being looked at?

A. You're putting 100 percent of the supernate down onto the filter.

Q. And that's 100 grid openings?

A. Well, the filter is 201 millimeters squared. That's the filter where the material is put through the filter to collect it.

And then you're looking at 100 grid openings. So 100 grid openings is 1.1 millimeter. So 1.1 millimeter of the 201 millimeters will now give you the percentage of what you're looking at on that filter.

Q. Why are you calculating that percentage? Isn't 100 percent of what comes through the filter in the grid openings -- in the 100 grid openings?

MR. CIRSCH: Object to form.

THE WITNESS: No.

Q. (By Mr. Chachkes) Okay.

A. Can I draw on something?

Q. Yeah.

A. The filter is much bigger than 100 grid openings.

Q. Let me just -- here --
MR. CIRSCH: Here you go.
MR. CHACHKES: That would be great. Thank you.
THE WITNESS: So if you have a filter that's this big -- that's not bad -- and then your grids are 3 millimeters. So -- shall I make a happy face here?
Q. (By Mr. Chachkes) Please don't.
A. **So each one of these grid openings -- and I'm blowing it up.**
So you're taking 7 millimeter plugs and then each grid opening has 100 grids that are 100 by 100 microns, typically. So the material is going on this whole filter, and then you're just taking sections of the filter out for your TEM grids.
MR. CHACHKES: I see.
So can we just mark this as an exhibit, Exhibit 20, please.
(Defendants' Exhibit 20 was marked for identification.)
THE WITNESS: I didn't know you were going to mark it.
Q. (By Mr. Chachkes) You did know I was going to mark it.

A. **That's true.**
Q. So what you've drawn in Exhibit 20 -- so I just want to get my vocabulary correct -- that the filter size is the big white circle in which you've got the three dots, that's the -- thank you for marking that.
A. **Filter, which is 201 millimeters squared.**
Q. Got it.
A. **And that's the filtration area so you're always -- because it's in a device that holds it, it's not the whole size of the filter, but it's actually the area where filtrate is going down through it.**
Q. Right. Okay.
MR. CIRSCH: You're pulling those numbers from Exhibit 19; correct?
THE WITNESS: Yes. It's the same size for every one.
MR. CHACHKES: And if you would not comment.
Q. (By Mr. Chachkes) And the black dots that you have there, those are the grid openings?
A. **Those are the grids.**
Q. Okay.
A. **So a grid -- and this has been blown up -- is approximately 3 millimeters in diameter. Now, on this grid are openings.**

Q. Okay.
A. **And each one of these openings looks like this, and they are 100 micrometers in width in two directions. So when you look at a grid opening, you're looking in this area.**
Q. Okay. And I apologize for repeating it a little bit, but the -- just want to make sure the transcript's clear to correspond with the picture.
You've got drawn, it looks like a circle with three black dots, that's the filter, and in the filter there are -- those black dots are grids; correct? So far correct?
A. **So far correct.**
Q. Okay. And how many grids -- I know your picture only has three, but how many grids are actually in your filter in the lab?
A. **We make three grids.**
Q. Oh, so there are three grids?
A. **Correct.**
Q. And then you've drawn a couple arrows to emphasize what the grid is, and the grid has got basically a bunch of grid openings and that's 100 grid openings?

A. **Correct.**
Q. Okay. And each grid opening is, you said, 10 micrometers?
A. **100 micrometers.**
Q. 100 micrometers. Got it.
A. **100 micrometers, essentially a square, 100 micrometers for each XY dimension.**
Q. Okay. And when you extrapolate filters -- if the fibers you find in the filters back to the original weight of the sample, can you just walk me through that in conceptual terms?
A. **In conceptual terms, you know the area you've analyzed by the grid openings. You know the area of your filter, and you take the -- you determine the ratio of the amount of material on the filter and then go to the amount of material that would be on each grid opening, and then you take the number of fibers you have and then you back-calculate.**
So if I have three fibers in a known amount, and that amount is some percentage of the overall amount that I know that in the overall amount on the filter, this is how many fibers and bundles would be there because you have to assume a homogenous distribution on the filter.

16:24:58 **Q.** And do you look at the -- for your fiber
16:25:05 count, do you look at each of the three grids?
16:25:08 **A. We keep one for archive; we look at two**
16:25:11 **grids and 50 openings on each grid.**
16:25:13 **Q.** Okay. And why only 50 openings on each
16:25:18 grid?
16:25:18 **A. Well, typically the standard protocols,**
16:25:23 **the peer-reviewed protocols, usually state two grid**
16:25:28 **openings -- two grids, and so we put 50 on one and 50**
16:25:33 **on the other.**
16:25:34 **Q.** Why not 100 on one and 100 on the other?
16:25:37 **A. Well, that would take twice as much time.**
16:25:40 **And you could do that, or you could look at 300. It**
16:25:45 **doesn't change anything other than reduce your --**
16:25:48 **increase your analytical sensitivity.**
16:25:50 **Q.** Okay. Does the ISO 22262-2 lay out this
16:26:00 math for extrapolating from looking at a grid?
16:26:05 **A. No. It referenced the protocols. All TEM**
16:26:11 **analyses -- air sample, water sample, bulk sample --**
16:26:15 **is done in this manner. All analytical chemistry is**
16:26:19 **done in this manner.**
16:26:20 **If you take a gallon of water out of Lake**
16:26:24 **Michigan and you want to determine the amount of lead**
16:26:26 **in there, for example, hypothetical, you don't**
16:26:28 **measure the whole gallon, you measure, typically, a**

16:26:32 **couple of milliliters of the material and then you**
16:26:34 **extrapolate back on the overall concentration that**
16:26:37 **would be there.**
16:26:38 **The ISO TEM air sample method is the same**
16:26:40 **way. You're analyzing it and you find 4 or 5 fibers**
16:26:46 **in the grid opening, you're extrapolating back to**
16:26:49 **what is in the air samples.**
16:26:51 **Q.** Okay. Now, when you said the
16:26:57 peer-reviewed literature suggests looking at two of
16:27:00 the grids, can you give me an example of some such
16:27:05 literature?
16:27:05 **A. Well, there's lots of peer-reviewed**
16:27:07 **literature that used the standard protocols. If you**
16:27:09 **look at the AHERA, you look at ISO, you look at the**
16:27:12 **NIOSH 7402, you look at the PCM, anything that has to**
16:27:18 **do with TEM, you have two grid openings. The 7402**
16:27:23 **says 40 openings among two grids.**
16:27:28 **If you have a high number of fibers, then**
16:27:31 **you may stop on your second opening on one grid and**
16:27:34 **then go to the second grid. So the protocols**
16:27:38 **themselves state that.**
16:27:39 **Q.** Okay. Your analysts employed ISO 22262-2
16:27:44 to test for asbestos by TEM; is that correct?
16:27:46 **A. Yes.**
16:27:47 **Q.** And they use TEM to identify the particles

16:27:55 morphologically as asbestos; is that correct?
16:27:58 MR. CIRSCH: Object to form.
16:27:59 THE WITNESS: They use TEM to identify
16:28:01 regulated asbestos using morphology, EDXA and
16:28:08 SAED.
16:28:09 **Q.** (By Mr. Chachkes) Okay. So is there a
16:28:10 phrase that I can use that's not confusing to refer
16:28:12 to the visual aspect of TEM that's not, you know,
16:28:16 SAED or the other more different techniques?
16:28:19 **A. Well, if you say all the counting rules**
16:28:21 **for all the standard TEM methods that is not the**
16:28:26 **occupational exposure counting rules, they will all**
16:28:30 **state the same thing.**
16:28:31 **Q.** No, I'm just looking for a -- I want to
16:28:33 make sure we're speaking a common language, the
16:28:36 visual --
16:28:37 **A. How about just counting rules?**
16:28:38 **Q.** Well, we disagree as to what the counting
16:28:40 rules require.
16:28:41 So if I say the visual aspect of TEM as
16:28:46 opposed to the SAED and -- what do you call it when
16:28:57 you take a picture with the TEM?
16:28:59 MR. CIRSCH: Object to form.
16:29:00 THE WITNESS: Photomicrograph.
16:29:01 **Q.** (By Mr. Chachkes) Okay. So they use

16:29:02 photomicrographs to determine -- from the TEM to
16:29:05 determine morphology?
16:29:06 **A. No. They use the counting rules to**
16:29:08 **determine morphology, that it has parallel sides,**
16:29:12 **it's greater than .5 micrometers in length, it has at**
16:29:15 **least a 5-to-1 aspect ratio, and the chemistry in**
16:29:20 **SAED determines it to be a regulated asbestos, then**
16:29:23 **it's a regulated asbestos fiber.**
16:29:25 **Q.** I didn't ask what you look at to determine
16:29:28 whether it's asbestos or not.
16:29:29 What do you -- what physically are you
16:29:33 looking at to determine morphology? It's the
16:29:35 photomicrograph; right?
16:29:37 MR. CIRSCH: Object to form.
16:29:37 THE WITNESS: No. We're visually looking
16:29:40 through the microscope. And I'll use an
16:29:42 example. I'm looking at a magnification of
16:29:46 approximately 20,000 times, and in my field of
16:29:49 view a structure looking like this pen shows up.
16:29:55 The first thing I do is look at it and say
16:29:57 does it have parallel sides? The answer is yes.
16:30:00 We have calibration standards and go is it
16:30:03 greater than .5 micrometers in length? Yes.
16:30:08 Does it have an aspect ratio of greater than
16:30:11 5-to-1? I can visually see that, but we take a

photomicrograph -- it's close -- to make sure.
Q. (By Mr. Chachkes) So you use visual inspection through the TEM to determine morphology?
MR. CIRSCH: Object to form.
THE WITNESS: With the counting rules, that is correct.
Q. (By Mr. Chachkes) Okay. Well, it doesn't matter what the counting rules are. If you want to look at -- if you want to just see the morphology, you use visual inspection?
MR. CIRSCH: Object to form.
THE WITNESS: The first thing we do is look at it and if it has parallel sides and does it meet the counting rules where this is an elongated particle, that deserves further examination.
Q. (By Mr. Chachkes) Can you tell me where in ISO 22262 it provides -- directs you to look at morphology under TEM?
A. I did. I gave you the ISO standard for TEM and indirect prep, and in order to determine what your weight percent is, you have to determine if it is parallel sides, greater than .5 micrometers in length, and so on and so forth.
Not all methods replicate previous

methods. ISO 22262-2 does not put the entire counting protocol in there. It directs you to the TEM method where you have all these methodology to do that.
Q. Okay. So it's not, per se, in 22262, but you're saying there's a reference to another ISO standard which you say requires visual inspection under TEM to determine morphology?
MR. CIRSCH: Object to form.
THE WITNESS: Well, per se it doesn't replicate the entire procedure. That's how these standards work.
Once it has a document, in this case, another ISO document that lays out all the procedures and practices for how to identify regulated asbestos, it just goes back to that.
Q. (By Mr. Chachkes) So --
A. ASTM is the same way, and the definition of asbestos fibers in ASTM has another document that tells you all the different definitions. One builds on the other.
Q. Okay. Just looking at 22262, there is a section in there under part 1 that is labeled Morphology; right?
Exhibit 4 is the one that's part 1?

A. Oh, part 1, I'm sorry.
Q. Yeah. I'll just direct your attention to 7.2. -- on page 22.
So there's a section on page 22 which has the heading Morphology; correct?
A. That is correct. 7.2.3.7.1. I'm surprised you didn't know that.
Q. I did, actually.
And the only heading, as far as you know, in the ISO 22262 parts that actually says morphology is this one? Or do you not know? I don't want to spend all day on that one.
MR. CIRSCH: Form.
THE WITNESS: Well, this is a PLM analysis. This is not TEM analysis. And ISO has their PLM analysis setup, and these are the counting rules of what you do when you're analyzing under a polarized light microscope versus a transmission electron microscope.
Q. (By Mr. Chachkes) Did you use PLM to identify the morphology of the fibers you found in the MDL?
MR. CIRSCH: Object to form.
THE WITNESS: Well, that's worded -- and I apologize. That's worded poorly.

For our ISO 22262-1 PLM analysis, yes. We went through, and each of these regulated asbestos fibers that we have in there in pictures follow this morphology.
Q. (By Mr. Chachkes) Okay. In your reports you write on page 12, Amphibole fibers or bundles with substantially parallel sides and an aspect ratio of 5-to-1 or greater and at least half a micrometer in length were counted as regulated asbestos fibers and bundles per the standard TEM counting rules described by -- and then you cite six methods. Are you with me so far?
A. I am.
Q. Which is the method you actually use?
A. Well, can't really point to any one method because they all have the same counting rules.
Q. Okay.
A. What page was that?
Q. I was just talking about page 12 of your January 15.
A. I think it states that.
This is for, again, TEM. And every one of those TEM methods have those counting rules, so I referenced them all.
MR. CHACHKES: So I'm going to mark as the

next exhibit ISO 13794. We are on Exhibit 21.

(Defendants' Exhibit 21 was marked for identification.)

Q. (By Mr. Chachkes) So we spoke a little bit before about what's been marked as Exhibit 21; right?

A. Yes, sir, we have.

Q. Okay. And going to the seventh page in section 1, Scope. Section -- we're here.

A. What page? 7? Did you say 7?

Q. Actually, strike that.

I'm sorry. So it was the seventh page of the PDF, so let's strike that and start again.

Going to what's numbered in the exhibit as page 1, going to the heading 1, this is Scope; right? It's the scope of the ISO standard?

A. Correct.

Q. Okay. Subsection 1.1, which is substance determined; do you see that?

A. I do.

Q. And then you see at the last sentence, The method cannot discriminate between individual fibers of asbestos and nonasbestos analogs of the same amphibole mineral.

Do you see that?

A. I do.

Q. Do you agree with ISO 13794 that this method cannot discriminate between individual fibers of the asbestos and nonasbestos analogs of the same amphibole material?

A. Yes and no. If you're analyzing samples over and over from the same source and you're seeing both what people will clearly say is asbestiform bundles and you have some individual fibers in there, in my opinion you can discriminate against that.

If I was looking at one fiber and I didn't have any information about it and hadn't analyzed sample after sample, I would say that one fiber, it's asbestos, it's asbestiform because it's formed like asbestos, but, no, it does not meet the geological definition for asbestos, high tensile strength, flexible, and so on and so forth.

But to me, asbestiform means that it is fibrous like asbestos; I would call it asbestiform.

Q. So it's your understanding when -- in this exhibit, in this ISO standard, when it says it can't discriminate between asbestos and nonasbestos analogs, it's referring to geological definitions and not regulatory definitions; is that your testimony?

MR. CIRSCH: Object to form.

THE WITNESS: Well, it is regulatory. If it -- even though it cannot discriminate, you have to count it, and it is a regulated asbestos fiber if you decide it's asbestiform or not. It does not allow you to discriminate between the two as long as it meets the counting rules. It is regulated.

Q. (By Mr. Chachkes) Okay.

A. Now, we can argue over back and forth if it is asbestiform or not. But make no mistake, it is a regulated asbestos fiber if it meets the counting rules.

Q. Okay. So you're saying that something can meet the counting rules, be regulated, but it might be the non -- you might be counting nonasbestos analogs?

MR. CIRSCH: Object to form.

THE WITNESS: It's not nonasbestos.

It's --

Q. (By Mr. Chachkes) I'm using the phrase in --

A. It is not nonasbestos. If it meets all the counting rules, it's a regulated asbestos fiber. That's my position on that.

Q. Okay. In this last sentence of 1.1, it

makes a distinction between asbestos and nonasbestos analogs; do you see that?

A. I see that.

Q. That's black and white; right?

MR. CIRSCH: Object.

THE WITNESS: That's what it states.

Q. (By Mr. Chachkes) Okay. So tell me what asbestos versus nonasbestos analogs mean in ISO 13794.

MR. CIRSCH: Object to form.

THE WITNESS: They don't really define it other than to say it may not.

In my opinion, if it is fibrous, asbestiform, fibrous like asbestos-form, it is asbestiform.

Q. (By Mr. Chachkes) Yeah, but what I want is can you make any -- reading -- looking at that sentence, there's a clear distinction between asbestos and nonasbestos analogs. What's the difference?

It doesn't matter what you think. What is the ISO -- what distinction are they making? Or you just can't say?

MR. CIRSCH: Object to form.

THE WITNESS: It's not that they don't

say. They don't tell you how to determine between, quote, this nonasbestos -- this nonasbestiform versus asbestiform. There is no method for doing that.

Q. (By Mr. Chachkes) Okay. Is it your opinion because they don't give a definition of the distinction, they really didn't mean that distinction?

A. I can't say what the --

MR. CIRSCH: Object to form.

THE WITNESS: -- what Eric Chatfield had in mind when he said that.

Q. (By Mr. Chachkes) Okay.

A. But in the protocol, what I look at as a scientist, and we look at these protocols, what does it say to make the determination between the two? It doesn't give you any information. Same thing with the whole asbestiform, high tensile strength, et cetera.

But we have the ability now, we have analyzed so many samples and have analyzed so many regulated asbestos fibers and bundles that we have enough information if that is really at issue that these are all asbestiform.

But no matter if you want to argue that

it's not, it is, for single fibers, it's all regulated asbestos fibers per these protocols.

Q. Yeah, you've already said that a number of times, and I'm not going to take issue with your opinion in that regard.

What I want to know is the phrase nonasbestos analog appears in ISO 13794. What does it mean? And if you have no idea, that's fine.

MR. CIRSCH: Object to form.

THE WITNESS: It's not that I don't have any idea. I have an opinion about it. And it's not my opinion that they're regulated asbestos or not and you count them. The protocol tells you to count them, that this is a regulated asbestos fiber, you will record it on a count sheet. All these protocols do that.

It doesn't give you the information to make the determination. Just like it doesn't give you the information to determine if you have high tensile strength. It does not give you the information to make the determination what a population is. It does not give you the information to make a determination if it's flexible or not.

Q. (By Mr. Chachkes) Putting aside what gets

counted and what doesn't get counted, what does nonasbestos analogs in this sentence mean? What does that phrase mean?

MR. CIRSCH: Object to form. And this is the last time he's going to answer this question.

THE WITNESS: I don't know what they're saying what it means because they don't give you any information to make that determination.

I look at just simply what does asbestiform mean. It means formed like asbestos.

So you may not like my opinion, but that's my opinion.

Q. (By Mr. Chachkes) You know that under 2.6 on page 2 it says, Asbestiform is a specific type of mineral fibrosity in which fibers and fibrils possess high tensile strength and flexibility.

You see that; right?

A. What is it? 2.6?

Q. 2.6. Do you see that?

A. Yes, I do.

Q. Would it be reasonable to conclude nonasbestiform is something that is an analog to something that is asbestiform under 2.6?

A. No.

MR. CIRSCH: Object to form.

THE WITNESS: The protocol doesn't tell you what any of that means. High tensile strength. What tensile strength? How do you measure that?

That's just a general geological definition for somebody who may be interested in digging asbestos out of the ground, and is it going to be fibrous enough to be profitable?

That has no meaning in the protocol. Otherwise, in a protocol for how to do the analysis, how do you determine it's high tensile strength? What does high tensile strength mean? Is it 10,000 high, is it 2,000 high has no bearing on the actual analysis in the protocol.

Q. (By Mr. Chachkes) Okay.

A. This is nothing more than a standard geological definition for a high fibrous mine of asbestos.

Q. In your opinion, is the sentence that this method -- this ISO method can't discriminate between individual fibers of asbestos and nonasbestiform analogs, is it related to those definitions in 2.6, 2.7?

A. No, because those definitions aren't defined anywhere in the protocol for the analysis.

Q. Okay. And so when ISO uses the word asbestos on page 1, it's not related to how ISO defines asbestos on page 2?

MR. CIRSCH: Object to form.

THE WITNESS: On page 2, if you go to page 3, they define what a fiber is.

Is it page 3 or page 4? Give me a second.

ISO defines a fiber -- for the purpose of this International Standard, a fiber is defined to have an aspect ratio equal or greater than 5-to-1 and a minimum length of 5.0.

Fiber bundle, structure composed of parallel smaller diameter fibers attached to longer lengths.

Fibrous structure.

And then you go to, okay, once I've defined it as a fiber, in the method tells you to -- how to identify it if it is asbestos fiber or not.

Nothing else in there tells you anything about how to determine tensile strength, how to determine flexibility, how to determine the pop -- this one doesn't say population, but some

do.

Q. (By Mr. Chachkes) It's a simple -- very simple question. Page 1, the word asbestos is used. On page 2 I see a definition of asbestos. Is it your testimony that the two are unrelated, or are they related?

MR. CIRSCH: Object to form.

Q. (By Mr. Chachkes) It's a yes or no. Are they related?

MR. CIRSCH: Object to form.

THE WITNESS: This is not a yes and no question. You have to take the whole protocol into consideration to answer this question.

The whole protocol determines what is a regulated asbestos, and then the asbestiform and high tensile strength is just a general definition. That's what it means.

Q. (By Mr. Chachkes) Okay. So if I want to figure out what nonasbestos analog means in 1.1, I could not use definitions like 2.6, 2.7, 2.8 to help me determine that?

MR. CIRSCH: Object to form.

THE WITNESS: Well, those definitions tell you what is a regulated asbestos fiber. There is nothing in the protocol that tells you how to

make the determination other than the counting rules.

Certainly, if it doesn't have parallel sides, if it is a piece of a chunk of rock, yeah, that's nonasbestiform. But when it has the definition and meets the regulatory fiber definition for asbestos, it is asbestos.

Q. (By Mr. Chachkes) Okay. But you agree with the sentence in -- all right. Strike that.

You personally can distinguish between asbestos and nonasbestos analogs with TEM; is that correct?

MR. CIRSCH: Object to form.

THE WITNESS: Yes, I can.

Q. (By Mr. Chachkes) Using the ISO 13794 method; correct?

A. Yes, I can. If it doesn't meet the counting rules, it doesn't have parallel sides, it doesn't have the aspect ratio, I don't record that as an asbestos -- as an asbestos -- regulated asbestos fiber.

Outside those counting rules, there's nothing else in there. If it has parallel sides -- and what we're arguing is a small number of fibers. I think in the MDL we had almost 90-something percent

bundles.

So then we're dealing with some single fibers. And because we have this -- and I'll call it -- since a population is more than one, for these two mine sources we're dealing with, we have a large number of asbestiform bundles and a much smaller number of individual fibers.

Q. Would you agree that there are two types of tremolite --

MR. CIRSCH: Did you finish your answer, Dr. Longo?

THE WITNESS: I think so.

Q. (By Mr. Chachkes) Would you agree that there's two kinds of tremolite: asbestiform and nonasbestiform?

A. I agree there's tremolite asbestos; and then there's tremolite asbestos, regulated tremolite asbestos. Then there is what we don't count as a regulated asbestos fiber because of various reasons.

Q. Is there such a thing as nonasbestiform tremolite?

A. There is cleavage fragment type small particulates of tremolite that we do not count. You can call it nonasbestiform; you can call it a cleavage fragment. But I would agree with that.

Anything below 5-to-1 aspect ratio we don't count. And you can call it whatever you like, but it's not a regulated asbestos fiber/bundle.

Q. Okay. Do you ever -- do you feel like you have the ability to talk about a mineralogical -- what you called a mineralogical definition of asbestos? Or is that outside of your expertise?

A. You mean a geological definition?

Q. Or a geological.

A. Sure.

Q. Okay. Geologically, what's a nonasbestiform asbestos?

A. Rocks.

Q. That's it? Everything that's rock is nonasbestiform asbestos?

MR. CIRSCH: Object to form.

THE WITNESS: If it doesn't have a fibrous habitat, it's nonasbestos.

Q. (By Mr. Chachkes) Okay.

A. Or habit -- excuse me -- not habitat. I think that's where animals live. I apologize. Strike that.

If the crystalline habit is not fibrous, then it's not something that is mined or used as a regulated -- and it's not determined to be a

regulated asbestos.

Q. All right. You remember the original question was not about regulations; it was about the geological definitions; right?

MR. CIRSCH: Object to form.

THE WITNESS: I believe I have enough expertise to discuss the geological definitions, to discuss this high tensile strength, to discuss what the value of a mine is that has very matted, very fibrous asbestos, like chrysotile, versus what a ton of the same asbestos where it's 7M and it's almost two orders of magnitude difference. It's about the viability of a particular asbestos mine.

Q. (By Mr. Chachkes) Okay. Tremolite alone does not mean it's asbestos; would you agree with that statement --

MS. O'DELL: Object to form.

Q. (By Mr. Chachkes) -- saying something's tremolite?

MS. O'DELL: Object to form.

THE WITNESS: It depends on what you're talking about. If you're talking about, say, XRD 20, 30, 40 years ago, said tremolite in a particular mine and over time that particular

mine has shown that the tremolite in there is primarily asbestiform, then, yeah, you can take all the data specifically and say, well, this whole data with XRD shows that there was tremolite present, but no, it doesn't -- XRD does not give you fibrous. But after a while, if you analyze enough samples out of the mine and you're seeing regulated asbestos fibers and bundles, then more likely than not those initial XRD analysis was asbestos.

Q. (By Mr. Chachkes) Without referring to the -- so you understand that I can look at a tree in many different ways. I can look at it through a microscope, I can look at it through a telescope, I can look at it with my own eyes. So far you're with me?

A. So far.

Q. Okay. Do you understand that the way I look at it doesn't change the definition of whether it's a tree or not; right?

MR. CIRSCH: Object to form.

Q. (By Mr. Chachkes) Is that true or not?

MR. CIRSCH: Object to form.

Q. (By Mr. Chachkes) I'm only asking about the tree now.

A. I don't think you would be able to tell by a telescope. But if you're looking at a tree, it's a tree.

Q. Right. It doesn't matter how I'm looking at it. A tree is a tree; is that correct?

MS. O'DELL: Object to form.

THE WITNESS: Your tree analogy for a tree, that's correct.

Q. (By Mr. Chachkes) Okay. So are you saying it's different for asbestos? I call something asbestos or nonasbestiform depending on how I look at it?

MR. CIRSCH: Object to form.

THE WITNESS: No. It's sort of a misleading kind of analogy.

What I'm talking about is back 50 years ago, when you're looking at a tree, you said it was a tree. Somebody asked later that -- people went in who actually knew what trees were and said, well, 95 percent of these are oak trees 40 years later. Then you go, well, what was I actually looking at 50 years ago for these same trees? Well, oak trees.

Q. (By Mr. Chachkes) I'm just talking about -- okay. Stick with me here. Don't talk about

history. Don't talk about the way I'm looking at things. Don't talk about regulations.

Just strictly objectively, what is nonasbestiform versus asbestiform?

MR. CIRSCH: Object to form.

Q. (By Mr. Chachkes) And if you can do that without telling me -- without -- can you do that without talking about the device I'm looking at it with? Is that possible?

MR. CIRSCH: Object to form.

THE WITNESS: No --

Q. (By Mr. Chachkes) Okay. What --

A. -- because --

MR. CIRSCH: Let him answer.

THE WITNESS: What we're doing here is we're using sophisticated devices to make the determination if these are regulated asbestos or not.

I understand that maybe for whatever reason you want to just pick little pieces here and there, but this is not what we do with this analysis.

We're using standard peer-reviewed published protocols for the determination of regulated asbestos fibers and bundles.

Q. (By Mr. Chachkes) Tremolite -- just saying something is tremolite does not mean it's asbestos in certain contexts; is that true?

MS. O'DELL: Object to the form.

THE WITNESS: Again, when we do these analyses, anything that doesn't meet the regulated asbestos counting rules we do not count. You can call it whatever you like, but it doesn't meet the counting rules.

Everything that we have published and provided here is regulated asbestos fibers and bundles.

Q. (By Mr. Chachkes) Okay. What is a cleavage fragment?

A. Cleavage fragment, typically for tremolite, is particulates that have an aspect ratio of somewhere between 1-to-1 to 1-to-2, but they will have the same chemistry and the same crystalline pattern.

Q. Do you agree with ISO 13794 when it defines cleavage fragment as a fragment of a crystal that is bounded by cleavage faces?

A. Yes.

Q. Would you agree with this statement: Crushing of nonasbestiform amphiboles can -- I'm

sorry. Strike that. Start again.

Do you agree with this statement: Crushing of nonasbestiform amphibole can lead to elongate fragments that conform to the definition of a fiber?

A. I've not seen those with these counting rules. Certainly we have seen lots of these fragments that are below 5-to-1 aspect ratio.

I'm not ruling it out, but we typically don't see that. When we did a size distribution of --

Q. I'm not talking about what you can't see --

MR. CIRSCH: Hold on.

THE WITNESS: Hold on, hold on.

We don't typically see that but your hypothetical, if it does have parallel sides, if it does meet all the definitions of the counting rules, you can call it what you like, but it's regulated asbestos per the standard counting rules for every one of these TEM methods that I have referenced in my report.

Q. (By Mr. Chachkes) I kind of lost track there.

Do you agree with the statement: Crushing

of asbestiform amphibole can lead to elongate fragments that conform to the definition of a fiber?

MR. CIRSCH: Object to form.

THE WITNESS: I've not seen one, so maybe somebody else has.

Q. (By Mr. Chachkes) Okay. Do you agree with the statement: Crushed nonasbestiform amphiboles rarely have aspect ratios exceeding 30-to-1?

A. I've not seen crushed -- I'm sorry, would you repeat that?

Q. Crushed nonasbestiform amphiboles rarely have aspect ratios exceeding 30-to-1.

A. I've rarely seen anything greater than 1-to-1, 2-to-1, 3-to-1.

Q. The question is do you agree with that statement, yes or no?

A. That's too broad. I mean, I would say crushed particles of nonregulated asbestos fibers and bundles, the aspect ratio very rarely exceeds 3-to-1, 4-to-1.

Q. Okay. ISO -- strike that.

What is the average width of a tremolite fiber under the TEM?

MR. CIRSCH: Object to form.

THE WITNESS: An individual fiber typically can run anywhere from about .2 to .4, seen some as high as .5 for an individual fiber.

Q. (By Mr. Chachkes) Okay. Do you have a peer-reviewed reference to support that?

MS. O'DELL: Your original question was what he had seen.

MR. CHACHKES: Actually, no. The original question was what is the average width.

THE WITNESS: I think if you look at Wylie and others, they say that single tremolite or single amphibole fibers very rarely exceed .5, .6. So there's a number of references out there. I can't remember all the citations, but there's a number of references on that.

Q. (By Mr. Chachkes) The question is do you have a peer-reviewed reference to cite to to support your testimony that the average width of a tremolite fiber is usually between .2 and .4?

MR. CIRSCH: Object to form.

THE WITNESS: I've seen as high as .5. There's a range. And it's been published before, but no, I don't have the citation on me.

Q. (By Mr. Chachkes) What's the average width of an anthophyllite fiber under TEM?

MR. CIRSCH: Object to form.

THE WITNESS: Typically in the same range as tremolite.

Q. (By Mr. Chachkes) And do you have a citation for a peer-reviewed paper to support that?

A. Not that I can rattle off the top of my head, no, sir.

Q. What's the largest width an anthophyllite particle can have and still be characterized as a fiber under TEM?

MR. CIRSCH: Object to form.

MS. O'DELL: Would you repeat that, please?

Q. (By Mr. Chachkes) What is the largest width of an anthophyllite particle -- strike that.

What is the largest width an anthophyllite particle can have and still be characterized as a fiber under TEM?

A. Whatever width that will exceed equal to 5-to-1 aspect ratio. So it doesn't have a cutoff on the width for a single fiber. As long as it exceeds -- greater than or equal to 5 -- aspect ratio of 5.

Q. So the width doesn't matter; it's the aspect ratio that matters?

A. Correct.

Q. Okay. Do you have a reference, peer-reviewed reference, to cite for that?

A. Every one of the counting protocols do not have a maximum on the width. They all have the same counting protocol for the aspect ratios for the length, for greater than .5 micrometers. So they're all the same.

I'm not aware of any of these peer-reviewed publications, protocols, stating that there is a maximum width.

MR. CIRSCH: We've been going about an hour, so when you get to the next spot, can we take a break?

MR. CHACHKES: Sure. Give me maybe like 5 more minutes; is that okay?

MR. CIRSCH: It's up to the doctor.

THE WITNESS: I would like to take a break now.

Q. (By Mr. Chachkes) Okay. Can I just ask -- let me ask one more --

A. Okay.

Q. -- because it's just basically the same one, tremolite.

What is the largest width a tremolite

particle can have and still be characterized as a fiber under TEM? Is it same answer?

A. It's the same answer. Now, we don't see any single fibers with widths that exceed or that are any width. I mean, it's in that range that I've talked about.

Typically, when it gets larger, it is a bundle, and you can have -- we've had bundles as wide as 1 to 2 micrometers in diameter, but that's made up of -- something that big is made up tens to hundreds of individual fibers.

Q. But hypothetically, you see a tremolite particle with a width of 1, you would still characterize that as a fiber if the aspect ratio was in the right range?

MR. CIRSCH: Object to form.

THE WITNESS: Hypothetically, because I don't believe we've ever seen one in any of these protocol -- any of these analyses. But if it has -- if it meets the peer-reviewed counting rules for regulated asbestos, yes, it would be counted, hypothetically.

MR. CHACHKES: Okay. Let's take a break.

(Recess from 5:01 p.m. to 5:20 p.m.)

Q. (By Mr. Chachkes) Going back to

17:21:07 Exhibit 21, which is ISO 13794, now, 2.7, that's a
17:21:16 definition of asbestos; correct?
17:21:20 **A. 2.7?**
17:21:21 Q. Yes. On page 2.
17:21:23 **A. Oh.**
17:21:42 Q. Is that a definition of asbestos?
17:21:45 **A. That's their definition, yes, sir.**
17:21:47 Q. Okay. Now, I've heard you use the phrase,
17:21:50 the distinction, geological and regulatory
17:21:54 definitions as if they were different. Which one is
17:21:57 this?
17:21:58 **A. It's just a general definition.**
17:22:04 Q. Okay. It's not a geological definition,
17:22:07 it's not a regulatory definition, it's just a
17:22:09 definition?
17:22:10 **A. Let's see. Crystallized in asbestiform**
17:22:14 **habit. That's for both. Long, thin, flexible,**
17:22:18 **strong fibers when crushed or processed. They don't**
17:22:20 **define what strong is, but that's just a general**
17:22:23 **definition.**
17:22:23 Q. Okay. Is it your opinion that there's no
17:22:28 such thing as a cleavage fragment for something that
17:22:31 has a greater than 5-to-1 aspect ratio?
17:22:33 **A. I never said that.**
17:22:34 Q. Okay. Is there such a thing as a cleavage

17:22:40 fragment for something that has a greater than 5-to-1
17:22:41 aspect ratio?
17:22:41 **A. With parallel sides we've not seen one,**
17:22:44 **but I guess hypothetically it's possible.**
17:22:46 Q. Okay. Is there anything in the published
17:22:55 literature that you've seen that suggests that there
17:22:58 are cleavage fragments with a greater than 5-to-1
17:23:02 aspect ratio?
17:23:02 **A. There's been a number of published**
17:23:05 **articles that state things like that, yes.**
17:23:08 Q. Are there any published articles that
17:23:11 state that there are cleavage fragments that have
17:23:13 greater than 3-to-1 aspect ratio?
17:23:15 **A. Yes, there is publications that state**
17:23:19 **that.**
17:23:19 Q. Okay. If I pulled a hand-sized amphibole
17:23:27 rock out that had a greater than 5-to-1 aspect ratio,
17:23:32 would you call that a fiber?
17:23:34 MR. CIRSCH: Object to form.
17:23:34 THE WITNESS: If it is a rock and doesn't
17:23:36 have any parallel sides that define a fiber, no.
17:23:40 Q. (By Mr. Chachkes) Does MAS have a
17:23:42 protocol in place for describing the dimensions of
17:23:44 fibers under the visual inspection under TEM?
17:23:47 **A. Yes.**

17:23:48 Q. Is it written down?
17:23:51 **A. Yes.**
17:23:51 Q. Have you produced it?
17:23:53 **A. No.**
17:23:54 MR. CHACHKES: Okay. We'd like that
17:23:56 produced.
17:23:56 MS. O'DELL: We'll consider it.
17:23:57 Q. (By Mr. Chachkes) Okay. Does MAS have a
17:23:58 protocol in place for describing the dimensions of
17:24:01 fibers -- sorry.
17:24:10 What do you call that protocol? Is there
17:24:12 a name for it?
17:24:13 **A. Well, the protocol is the method we have**
17:24:16 **here. It tells you how to make those measurements.**
17:24:18 **It has -- the microscopes have calibrated concentric**
17:24:24 **circles that allow you to make the measurements for**
17:24:28 **greater than .5 micrometers. It is -- parallel sides**
17:24:33 **is a visual determination.**
17:24:37 MR. CHACHKES: Let's look at that. Let's
17:24:39 look at some TEM photomicrographs. Can we mark
17:24:43 this Exhibit 22? Can we just put the sticker
17:24:52 here so it doesn't obstruct anything?
17:24:54 (Defendants' Exhibit 22 was marked for
17:25:15 identification.)
17:25:15 Q. (By Mr. Chachkes) All right. Look at

17:25:16 Exhibit 22. Can you tell me what -- that very top
17:25:22 row of three, is that asbestiform fibers, if you knew
17:25:28 you were looking at an amphibole?
17:25:30 **A. Top row, this one?**
17:25:32 Q. Yeah.
17:25:34 **A. Just looking at the photograph, I would**
17:25:38 **state that that is a regulated asbestos size --**
17:25:41 **asbestiform or not for these different photographs.**
Q. All right.
17:25:48 **A. Certainly one, I would say two. I'd have**
17:25:52 **to be looking at that under a TEM to make that**
17:25:55 **determination if it's asbestiform or not. It**
17:25:57 **certainly has the aspect ratio; it has parallel**
17:26:01 **sides. That would be a regulated asbestos, at least**
17:26:02 **in TEM. It's unclear. This may be -- this may be**
17:26:10 **optical microscopy.**
17:26:13 Q. That third one on the very top row, what
17:26:17 could you see under TEM or do under TEM that would
17:26:20 make you say, oh, that's not regulated asbestos,
17:26:25 assuming it's an amphibole?
17:26:26 **A. Well I would have to be looking at it**
17:26:28 **under the TEM so -- you're looking at an optical**
17:26:32 **microscopy picture.**
17:26:33 Q. But what is it you would be -- what is it
17:26:36 that you could see under a TEM that would make you

think that's not -- because the aspect ratio obviously is greater than 5-to-1; right?

A. Well, I would take a look at it and see parallel sides, is that multiple fibers. I don't know what magnification this is at.

So again, I would prefer to be looking at something under a TEM than just play guess-what-this-is.

Q. Okay. So it's possible what you're looking at there which has an aspect ratio of -- it's greater than 5-to-1; right?

A. That's correct.

Q. Okay. It's possible that that's not -- that's nonasbestiform if it doesn't have parallel sides; is that true?

A. Again, this is an optical microscopy picture. So unless I was looking at this under the TEM, but certainly has parallel sides. I don't know the width. I can't really make out the micron bar, I don't know the magnification.

So you'll have to get some other expert to take a look at it, if he's willing to opine what that is versus the counting rules in the TEM.

Q. In the second row, assuming that everything in the second row is amphibole, would you

call those asbestiform or not?

A. Again, I'm looking at an optical microscopy picture. We've got a bundle that -- I mean, I can't look at the micron bar. Possibly just the one in the middle because you can see individual fibrils.

Q. Okay. If you saw that under your TEM, would you label that as asbestos?

A. Well, I'm not looking at it under TEM. So if it's under an optical microscopy method and it meets the definition, it's got parallel sides, it looks like it has multiple fibers in the bundle, that by definition is asbestiform.

Q. And why do you say it looks like it has multiple fibers in the bundle?

A. Because I can see them.

Q. Okay. You're referring to the lines that go from the northwest towards the southeast starting in the top?

A. Yes, sir.

Q. Okay. In the third row, assuming those are amphiboles, do you have enough information to determine whether they're asbestiform?

A. I can't really see what we have here under these. And I'm assuming the fourth and five row --

Q. Well, let's not get ahead of ourselves.

Now, in the third row, do you have enough information from these pictures to see whether they're bundles or fibers?

A. No. It's too out of focus.

Q. Okay.

A. I would -- looks like you have dark field here. I would have to see this in the TEM.

Q. Okay. In the second row, far left, do you have enough -- does it appear to you whether there are bundles or fibers?

A. No, you can't make out. Most of these are just particles. And I would have to be looking at this one that has parallel sides. But I would have to be determining if I could see individual fibers in it or not.

Q. In the fourth row, second from the bottom, are these asbestiform?

A. Maybe.

Q. What additional information would you need to determine that?

A. I need to be looking at it in the TEM or -- so that I can make a determination. The size, the magnification.

Q. Do you have enough information in the

second -- in that second-to-last row, those three pictures, to determine whether that's asbestiform?

A. I wouldn't make that call either way unless I could be looking at it under the TEM. It looks like very little magnification. And I apologize, but they're fairly poor photographs.

Q. Okay. In the last row, same question. In those three pictures at the very bottom of Exhibit 22, are those -- see the single fibers -- the single item in the middle, would you call that asbestiform?

A. It has parallel sides. I can't see individual fibers. But I would call that a regulated asbestos fiber or bundle, maybe.

Again, I would need to be looking at the TEM analysis of these or at least better photographs.

Q. Okay. So the bottom six are all TEM photomicrographs from you? You realize that; right?

MR. CIRSCH: Object to form.

THE WITNESS: And that's fine. If you tell me which ones they are, at least I can get better images.

Q. (By Mr. Chachkes) These are the images you provided to us; right?

A. Well, when we provide the book, we provide

a large photograph that has better resolution, et cetera.

Q. Okay. Yeah, let's go look at -- let's look in the book, the upper left. So from the bottom -- what?

MS. TROVATO: I'll let you know which one I have marked.

MR. CHACHKES: Okay. I'm going to grab one for you from the book. Just tear it out. Okay. Let's mark it as Exhibit 23.

(Defendants' Exhibit 23 was marked for identification.)

(Off the record.)

Q. (By Mr. Chachkes) Okay. So around page 985. Okay. So this one corresponds to second-to-the-last row, far right; correct?

A. **Yes.**

Q. Okay. Are you looking at something that's asbestiform there?

A. **I'm looking at a regulated asbestos structure. We have talc underneath it. But I would see individual fibers -- you know, I'm not on the TEM. This is only 1/2 micrometer in width, but it looks like we have individual fibers in here. So yes.**

Q. Okay. Is this -- so for those of us who are trying to determine whether you made the right call, is this photomicrograph enough to determine the morphology of what we're looking at?

A. **Yes.**

Q. Okay. In your old reports, the reports that were the non-MDL samples, would you agree that you characterized the majority of the particles identified as fibrous, not bundles?

MR. CIRSCH: Object to form.

THE WITNESS: I don't think I ever counted them up.

Q. (By Mr. Chachkes) Okay. In your MDL -- but the majority, the large majority is fiber, not bundles in the old MDL reports?

MS. O'DELL: Object to form.

THE WITNESS: I'm not sure I agree with that.

Q. (By Mr. Chachkes) I'm sorry, the old non-MDL reports.

A. **I'd have to look at them to see if I agree with that or not.**

Q. Okay. In your new -- the MDL reports, about 96 percent of the particles your analysts identify are bundles; correct?

A. **Correct.**

Q. If there's a stark difference between the ratio of fibers to bundle found as compared between the MDL sample analysis and the non-MDL sample analysis, what would explain that?

MR. CIRSCH: Object to form.

THE WITNESS: That there was more bundles than fibers.

Q. (By Mr. Chachkes) Aren't they supposed to be the same thing, representative sample of J&J talc?

MR. CIRSCH: Object to form.

THE WITNESS: Not necessarily.

Q. (By Mr. Chachkes) Why not?

A. **It's just a matter of where -- the area in the mine and what was dug out, if that was correct, then we should say that all J&J talc has these concentrations of asbestos. So that doesn't bother me.**

Q. You think it might be random chance that the same mine samples in your old reports you report majority of fibers, and in your new reports you report as almost exclusively bundles?

MR. CIRSCH: Object to form.

THE WITNESS: We just call them as we see them.

Q. (By Mr. Chachkes) But is it random chance? That's what I'm asking.

A. **I don't know if it's random chance or not. These are what we distinguish as fibers and bundles.**

Q. Okay. One would expect a random sample of bottles from a Vermont mine over time to have the same ratio whether you are looking last year or this year; right?

MR. CIRSCH: Object to form.

THE WITNESS: I'm only aware of in the old samples that there was two that could be said came from Vermont. So we're looking at a much bigger population of Vermont samples than we were of the originals. And one of those was a MDL sample. So you're comparing apples and oranges.

Q. (By Mr. Chachkes) What about the Italian?

A. **The Italian, I'd have to look at it and count them up because there wasn't that many fibers as compared to the others, so we have a bigger pool of fibers and bundles.**

Q. If you did the entire set of MDL samples over again, would you expect to find the same ratio of bundles to fibers?

MR. CIRSCH: Object to form.

17:36:17 THE WITNESS: I don't have any expectation
17:36:19 of what we're going to find or what we expect.
17:36:21 We just count using the protocols and make the
17:36:25 decision on what morphology it is.
17:36:27 **Q.** (By Mr. Chachkes) Okay. Have you
17:36:28 testified that the modified Blount TEM method you
17:36:31 employed in your March 2018 report is materially
17:36:35 identical to the ISO 22262?
17:36:37 **A. I don't think I -- it's not identical.**
17:36:43 **The old Blount report uses a different heavy density**
17:36:47 **liquid separation. But the ISO, we can use the same**
17:36:52 **spin rate, same time for rpm and spin rate.**
17:36:59 **But the difference is the -- even the old**
17:37:03 **Blount is the same. And that's -- what's interesting**
17:37:06 **about the ISO 22262-2, it gives you the leeway to use**
17:37:11 **whatever you need to use. And the only thing it**
17:37:16 **really specifies is the density of the heavy liquid.**
17:37:21 **Q.** You used the Blount TEM method in your
17:37:23 March 2018 report; correct?
17:37:24 **A. Correct.**
17:37:24 **Q.** Was it materially identical to what's
17:37:28 mandated in ISO 22262?
17:37:32 **A. ISO 22262 doesn't mandate any particular**
17:37:35 **conditions. So you can use whatever procedures you**
17:37:41 **feel work the best. And that's because the spin**

17:37:45 **rates and rpm does not really affect the overall**
17:37:48 **concentrations, and it happened to be the same**
17:37:51 **density, liquid density.**
17:37:53 **Q.** You've testified that the same four
17:37:56 associates at MAS have conducted all of MAS's
17:37:58 analysis of Johnson's Baby Powder in your reports
17:38:01 going all the way back to 2017; is that correct?
17:38:03 MR. CIRSCH: Object to form.
17:38:04 THE WITNESS: We have some of the same
17:38:08 people, yes.
17:38:09 **Q.** (By Mr. Chachkes) Okay. What about are
17:38:11 they the same? Is it the same people who were
17:38:13 doing -- analyzing Johnson Baby Powder in early 2017
17:38:19 as are doing it now?
17:38:22 **A. You'll have to clarify that question.**
17:38:25 **Q.** Well, there were four people doing
17:38:28 analysis in the MDL report; right?
17:38:30 **A. Correct.**
17:38:30 **Q.** There are four people doing analysis in
17:38:33 the reports that rely on research all the way back
17:38:39 to -- analysis all the way back to 2017; correct?
17:38:42 **A. I'd have to look at that.**
17:38:43 **Q.** Okay. I'm asking is it the same four
17:38:46 people? You don't know?
17:38:48 MR. CIRSCH: Object to the form.

17:38:49 THE WITNESS: I'd have to look and see who
17:38:50 the four people are because there are some folks
17:38:53 who started doing, you know, analysis now may
17:38:57 not have been doing analysis then, and there's
17:38:59 some folks doing analysis then that are not
17:39:02 doing analysis now. It's just easy to look in
17:39:05 the count sheets and see if they're the same or
17:39:08 not.
17:39:08 **Q.** (By Mr. Chachkes) Is there additional
17:39:12 data concerning the samples upon which you reported
17:39:15 for TEM that is in a file somewhere in your
17:39:20 laboratory but not printed out and not produced?
17:39:22 **A. All the data for these particular samples**
17:39:25 **are here.**
17:39:25 **Q.** Okay. Was there any data generated in
17:39:28 connection with the TEM analysis in this case that
17:39:30 was thrown away or deleted?
17:39:32 **A. No, not that I'm aware of.**
17:39:34 **Q.** You personally have not conducted any of
17:39:37 the PLM testing included in your MDL report; correct?
17:39:40 **A. That is correct.**
17:39:40 **Q.** Did you sit with your analysts as they did
17:39:42 the PLM testing?
17:39:45 **A. I have probably looked in that optical**
17:39:47 **microscope 50 times in the last two months.**

17:39:50 **Q.** So when you say you've looked in it,
17:39:52 you've looked in it while your analysts were testing
17:39:58 MDL samples for the purposes of your current report?
17:40:00 **A. Well, you can't -- both of you can't look**
17:40:02 **in the microscope at the same time. A lot of times**
17:40:05 **it's on the monitor that we use so that we can**
17:40:09 **increase the sensitivity. But, no, I don't**
17:40:12 **personally do the PLM analysis.**
17:40:14 **Q.** Yeah, but I'm trying to get the sense of
17:40:16 were you actively involved looking through the
17:40:20 microscope or looking along with the other person
17:40:23 into the microscope for the PLM that's reported on in
17:40:25 the MDL?
17:40:27 **A. I have been active with the PLM**
17:40:29 **microscopists looking at structures, looking at**
17:40:34 **different aspects of it, but ultimately he makes the**
17:40:38 **decision.**
17:40:38 **Q.** Okay. So the decisions -- the opinions in
17:40:43 your report about whether the PLM was a positive for
17:40:46 asbestos, those are the opinions of your analysts?
17:40:50 **A. It's not an opinion.**
17:40:51 MS. O'DELL: Form.
17:40:52 THE WITNESS: It meets the definition. It
17:40:54 has the right crystalline information. It meets
17:40:58 all the different definitions. To me, that is

not an opinion.
Q. (By Mr. Chachkes) Okay. Those are the conclusions of your analysts?
A. **Yes.**
Q. Okay. You have personally never tested a talc sample for asbestos from start to finish yourself?
A. **That is correct.**
Q. You're not trained in using PLM for the purposes of testing talc for asbestos?
MR. CIRSCH: Object to form.
THE WITNESS: I have not taken a PLM course for asbestos.
Q. (By Mr. Chachkes) You've not published any PLM methodologies?
A. **No, sir. We're not using our methodologies. We're using the standard protocol methodologies. So if we were to publish -- when we publish this, we would be publishing that this is the method we used. That's like everybody else.**
Q. Have you published any PLM work testing for asbestos in any context?
A. **Yes.**
Q. What is it?
A. **Our gasket study, our vermiculite studies,**

our -- that have been published. A number of papers are published where it's going to be a study on exposure. You usually have to determine what the concentration of asbestos is in the materials before you publish that.
Q. Those are published in peer-reviewed literature?
A. **Yes, sir.**
Q. Okay. But those are not finding asbestos in talc; right?
A. **No, sir. These are all construction products.**
Q. Are you an expert in PLM?
A. **I think I know more than the average layperson.**
Q. Are you an expert in PLM?
MR. CIRSCH: Object to form.
THE WITNESS: Again, that's up to a judge to be an expert.
I know how the analysis is done, I could do an analysis if I -- it would take me a lot longer than what people typically do.
Q. (By Mr. Chachkes) One of the disadvantages of PLM that you cite is that it cannot resolve particles less than 1/2 micrometer; is that

correct?
A. **Individual fibers, unless they have a number of fibers in a bundle. But we don't see individual fibers. In fact, we haven't seen any individual fiber in any of these analyses that we've done. They've all been very large bundles.**
Q. Is it unambiguously true that asbestos particles must be at least 1/2 micrometer in the smallest dimension to be visible under PLM?
A. **That's what's stated. We never see individual fibers of any size. Everything that we have run across is these very large bundles that have multiple fibers in them.**
Q. But I'm talking about not what you're actually seeing, but this is a matter of the resolution.
Must asbestos particles be at least 1/2 micrometer in the smallest dimension to be visible under PLM?
A. **It may be visible, but it's hard to go through the dispersion staining and everything associated to make a positive identification.**
So maybe theoretically that's possible, but it's not something that's routinely seen, that I know of.

Q. Do you have the ability to detect asbestos fibers with a width of approximately .3 micrometers by PLM?
A. **Again, it may be theoretically possible, but I'm not aware that it's routinely done. We've never seen any in the cosmetic talc.**
Q. Shouldn't the particle distribution be on a bell curve so that you would expect that some exist?
MR. CIRSCH: Object to form.
THE WITNESS: I'm sure there is -- it is in there because a lot of these we have positive TEMs. But these two techniques have different size distributions that they can see or they can resolve or not resolve to be able to absolutely determine if it is regulated asbestos or not.
Q. (By Mr. Chachkes) Is it your position that particles below 1/2 micrometer are not resolvable because your analysts have never observed particles of that width or smaller?
A. **It's my position that these are fibers, and single fibers are not being resolved in this matrix or seen by the PLM.**
Q. Is that because your analysts haven't observed it, or is it just because of the nature of

the devices? Do you have some higher level understanding of the nature of the devices?

MR. CIRSCH: Object to form.

Q. (By Mr. Chachkes) It is empirical or is it something different?

MR. CIRSCH: Object to form.

THE WITNESS: I don't know if it's empirical or not.

I mean, we haven't answered all the questions about the PLM analysis of cosmetic talc. But we do know that to do a PLM analysis properly, you have to spend the time necessary. You have to look at the sample in dispersion staining. You need a high definition camera as well as a monitor so that you can resolve and get the focal plane necessary to see individual fibers.

But we haven't run across individual fibers. I know every protocol says, well, you can see down to .5, you can see down to .3. There's one thing about seeing them. There's another thing going through the process of being able to see the colors in the dispersion staining, the extinction angle.

I just don't know if that's really

possible because this type of matrix that we're looking at is so different than what PLM analysts are typically dealing with.

Q. (By Mr. Chachkes) Did MAS test any talcum powder samples with the ISO 22262 method prior to the analysis included in your reports in this case?

MR. CIRSCH: Object to form.

THE WITNESS: No. I mean, we may have -- you know, we're slowly trying to work through the old non-MDLs so that we can compare apples to oranges. But when we get done with that, we'll issue another report.

Q. (By Mr. Chachkes) Have you analyzed the old talcum powder samples under ISO 22262 recently?

A. I don't know. I haven't been focused in on that. There may be some done.

Q. Is it possible -- strike that.

ISO 22262 method is promulgated by the International Organization for Standardization; is that correct?

A. Yes, sir.

Q. Are you currently a member of any of the ISO national standards bodies?

A. I am not.

Q. Did you vote on any of the ISO standards?

A. I did not.

Q. Did you participate in the drafting of any ISO standards?

A. I did not.

Q. Have you spoken with any of the authors of any of the ISO standards that we talked about today?

A. Not in some time, but not specifically about the 22262-1 and 2.

Q. What about 3?

A. No, sir, I haven't spoken to anybody about 3 -- any of the authors of 3.

Q. Which of the three parts of the ISO 22262 did your analysts employ in the analysis of the ISO PLM portion of your report?

MR. CIRSCH: Object to form.

THE WITNESS: All the counting rules, all the -- what's defined as asbestiform, what's the 20-to-1. Everything that's used in there.

Q. (By Mr. Chachkes) So you're saying it didn't matter, it's the same in all of 1 -- part 1, part 2, and part 3?

A. Well, I misunderstood the question.

Q. Yeah, let me ask it again a little better.

Which of part 1, part 2, or part 3 did your analysts use when they analyzed the MDL samples

under PLM?

A. Part 1.

Q. Do you know when those methods in part 1 were promulgated?

A. Looks like 2012/07/01.

Q. What do you mean by 2012/07/01?

A. I'm just looking at when it says it was issued. ISO -- so it has 2012, first edition, and I don't know if they're using 07 as the day and 01 as the month or the other way around.

Q. So part 1 was promulgated in 2012?

A. Yes, sir.

Q. Okay. Are you aware of any other talc testing methods published in the scientific literature from 1991 to 2014 that include a concentration method?

A. Let's see. When was --

Q. You should use yours.

A. I'm just looking at the date.

This one was 2014.

Q. You say this one's part 2; correct?

A. Part 2.

Q. Yeah. So I'm saying between 1991 and 2014, are you aware of any testing -- talc testing methods in the published scientific literature that

include a concentration method?

A. The 1989 and 1990 papers published by Blount. She's analyzing talc. She's using the concentration method.

Q. Are you aware of any other?

A. That specifically say talc, no.

Q. Are you aware of any other talc testing methods published in the scientific literature prior to 1991 that include a concentration method?

A. Not in the published literature, no.

Q. One strength of PLM is that it can provide a qualitative estimate of the weight percentage of asbestos; true?

A. That is a strength, yes.

Q. What does the word qualitative mean in that answer?

A. That it's an estimate based on petrographic standards for how much material is -- that you're estimating on.

Q. Your analysts conducted a visual estimation of the concentration of asbestos fibers in the talc samples?

A. Asbestos bundles, yes, sir.

Q. Okay. Your report also references generated weight percentage standards; correct?

A. Yes.

Q. How were your lab's weight percentage standards generated?

A. You mean the spike samples?

Q. Yes.

A. Taking that one JBP, I think it's number 13, and then you mix the appropriate materials together so that you get a weight percent -- a weighted percent, where you put -- say, hypothetically, you know, 5 grams of tremolite and then you then dilute the sample with additional talc to make it .1 or .2 or .3. Standard method.

Q. Okay. Did you produce those generated calculations?

A. No.

Q. Okay. We request that you produce those.

In your report you write that for positive samples a visual estimation of the quantity of asbestos observed was based on eye calibration through review of lab-generated weight percentage standards.

Does that ring a bell?

A. Yes.

Q. What is eye calibration?

A. It's a petrographic term for when you're

looking at the area that is covered by the asbestos versus the area that you're looking at. So there's calibrated petrographic materials to help optical microscopists to make these qualitative estimates.

Q. How often do you update your lab's weight percentage standards?

A. I think we updated them the last time we sent stuff to Lee Poye.

Q. And what regularity -- with what regularity do you update those?

A. We don't have a regulatory. We make new standards and send them off; and if we need additional standards, we make them again.

Q. Who generated those standards?

A. Victoria Panariello.

Q. Okay. Did you monitor her when she did that?

A. Did I sit here and -- stand there and watch her? No.

Q. Did you monitor her in any other way?

A. No.

Q. Are you aware your method includes a qualification that visual estimations of asbestos concentrations pursuant to this method have been demonstrated to consistently yield an overestimate of

the proportion of asbestos?

MS. O'DELL: Object to the form.

THE WITNESS: I'm sorry, where is this stated?

Q. (By Mr. Chachkes) In one of the ISO documents that you're referring to, does it say that this method that we're talking about consistently yields an overestimate of the proportion of asbestos? Are you aware of that?

A. I don't recall that.

Q. Okay. Do you believe that this methodology we're talking about consistently yields an overestimate of the proportion of asbestos?

A. No.

Q. Did your analyst use a point counting method?

A. No.

Q. ISO 22262-2 includes a method for point counting by PLM; correct?

A. It does.

Q. So instead of following the point counting method in ISO 22262-2, you used an estimation based on eyeball?

MR. CIRSCH: Form.

THE WITNESS: Estimation-based typical PLM

analysis, that's also in the 22262-1. They give you both, the ability to do either one.

Q. (By Mr. Chachkes) I'm talking about 22262-2, is there the eyeballing method in 22262-2?

MR. CIRSCH: Object to form.

THE WITNESS: We only do the section 16, section 14 in the counting rules for TEM in the ISO 22262-2.

Q. (By Mr. Chachkes) So is it your opinion that the ISO 22262-2 point counting method is not required; it's just merely optional?

A. 22262, if you are going to do PLM, it goes back to the 1, and it provides you the ability to do either/or.

Q. Okay. So it's your opinion that point counting in 22262-2 is optional?

MR. CIRSCH: Object to form.

THE WITNESS: You're going to have to show me where the point counting is in 22262-2.

Q. (By Mr. Chachkes) Okay. Sitting here today, rather than burning the time on that, do you have any reason to believe it's not optional, that it was required, you just didn't do it?

MS. O'DELL: Object to the form.

THE WITNESS: No, I don't believe that.

Q. (By Mr. Chachkes) Okay. Do you have any reason to believe it's optional and so you had the option of not going it?

MS. O'DELL: Object to form.

MR. CIRSCH: Object to form.

THE WITNESS: We follow the 22262-1 PLM method. It provides the ability to do both types of estimation. And point counting is another type of estimation.

Q. (By Mr. Chachkes) For those particles that you determined were asbestiform in your report, for each one, is it your opinion that these are minerals with a fibrosity in which the fibers and fibrils possess a high tensile strength and flexibility?

MR. CIRSCH: Object to form.

MS. O'DELL: Would you repeat that, please?

MR. CHACHKES: Can you read that back?

(The record was read by the reporter.)

MR. CIRSCH: Object to form.

THE WITNESS: Again -- I guess we could rehash this -- that is a general definition. The protocol does not provide you any methodology to determine high tensile strength

or any tensile strength.

It does not define what high is. It does not define how you determine flexibility on a microscopic scale.

I guess that is just an opinion of somebody taking a look at it. But it's not required for this analysis.

Q. (By Mr. Chachkes) I'm not asking a question at all about what's required. I'm asking about what your opinion is. Do the fibers you identified as asbestiform in your report possess high tensile strength and flexibility?

MR. CIRSCH: Object to form.

Q. (By Mr. Chachkes) Did you determine that?

A. You can't determine it. The protocol doesn't tell you how to determine it. It doesn't provide any guidance on how to determine it. It doesn't tell you what, quote, high tensile strength is.

High tensile strength to me, personally, probably 100 psi. I don't think that's what they mean, but at least there should be some guidance of some sort to say, okay, somehow you have to put an Instron inside your optical microscope and grab a microscopic bundle and put it in the Instron and then

measure the tensile strength, and it has to be over 5,000 psi. None of that exists.

A methodology is supposed to -- for a person using a methodology is step A, step B, step C, step D. There is no methodology for determining tensile strength, much less an undefined high tensile strength.

Q. Is there anything in the published literature that allows a scientist to determine the tensile strength and flexibility of a putative asbestos fiber?

A. Not individual fibers, no. There's plenty of literature that geologists walking around in a mine can make a grab sample, usually 10 to 15 centimeters long, they'll tape it to paper, it's very flexible at that, and then they'll put it in an Instron and pull it, and then they can determine the tensile strength.

Q. Have you ever heard of -- sorry.

A. Go ahead. I'm sorry.

Q. Did you ever hear of a PLM scientist looking at a sample and pushing it down and if it breaks versus whether it bends, that relates to tensile strength? Have you ever heard of that?

MR. CIRSCH: Object to form.

THE WITNESS: No. There's no protocol for that.

MR. CIRSCH: Alex, we probably should break any time in the next few minutes, if we can.

MR. CHACHKES: Yeah, we can take a break, that's fine.

(Recess from 6:01 p.m. to 6:53 p.m.)

Q. (By Mr. Chachkes) Dr. Longo, your analysts reported identifying cleavage fragments in many of the samples by ISO PLM; correct?

A. Yes.

Q. How many anthophyllite cleavage fragments did your analysts detect?

A. I don't recall them detecting any.

Q. How many tremolite cleavage fragments did your analysts detect?

A. We just determined -- we didn't do a count of how many cleavage fragments, only that they were present.

Q. Did you produce the data regarding the cleavage fragment particles in these samples?

A. I produced all the data we have. Some of the photographs you can see some of the cleavage fragments, others you can't.

Q. Did you quantify identified cleavage fragments the way you quantified identified asbestiform fibers and bundles?

A. No.

Q. And you don't report on cleavage fragments in your report; correct? I'm sorry, strike that.

You don't report on the concentration of cleavage fragments in your report; correct?

A. I do not.

Q. Okay. And you did not take that data?

A. Other than to note that they were present.

Q. Okay. And you cannot state to a reasonable degree of scientific certainty what the concentration of cleavage fragments in any of these samples were; correct?

A. We did not quantify the numbers of cleavage fragments that were observed other than that they were present.

MR. CHACHKES: Okay. Let's look at this one.

All right. We're going to look at a sample where the analyst reported both cleavage fragments and asbestos by PLM. Let's mark 24.

(Defendants' Exhibit 24 was marked for identification.)

Q. (By Mr. Chachkes) So you see at the bottom, this is a -- actually, what do you call this count sheet here, this sheet, Exhibit 24?

A. It's the PLM analysis bench sheet.

Q. Okay. So this Exhibit 24, which is your PLM analysis bench sheet for a particular sample, you see at the bottom that both cleavage fragments and asbestos particles were observed?

A. Yes.

Q. Okay. I see it says -- is it both actinolite and tremolite cleavage fragments were observed? Am I reading that right?

A. Yes.

Q. And let's go to -- and this is from your report, pages 120 to 128 from your January report, the analysis for bottle M68503-010-BL1; do you see that?

A. Yes.

Q. Okay. So let's turn to the picture -- the first picture we get to, which is I guess on page 2 of this document.

Which are cleavage fragments and which are asbestiform, or can you not tell?

A. Well the one that we see here that's measured as 69 micrometers, that is asbestiform. We

have many talc particles, and --

Q. How do you know which are the talc particles?

A. I'm looking at them. Because under dispersion staining they're usually anywhere from -- depending on the thickness of bluish to a brighter yellow.

And potentially, one other asbestiform down in the lower left-hand -- next to a fairly good size talc particle.

Q. It looks like the top of a T --

A. Yes --

Q. -- on its side?

A. -- that's a good description.

And as for cleavage fragments -- and I would have to be looking in the microscope, but I would say potentially one.

Q. Where?

A. There (indicating).

Q. So you're pointing to it looks like a yellow kernel of corn somewhere center left, and there's a very small kind of orangish stain right to the right of it; is that what you're looking at?

A. That's what I'm saying, potentially one.

Q. Okay. What about the next page? Do you

see any asbestiform particles, any cleavage fragments?

A. Well, we're looking at the exact same material. Now we're in perpendicular dispersion, which you have this color change, so there's no new information here.

Q. Okay. And so what you identified in the previous page as a potential cleavage fragment, is that what I see, it's kind of like center, down about halfway, above what looks like a yellow delta.

A. Yes.

Q. Okay. Looking at the purple page. Tell me when you're there. There's something an arrow is pointing at. What's that?

A. That's the same structure we've been looking at. It's at a higher magnification, 200 times.

Q. Okay.

A. So that's the actinolite/tremolite asbestos bundle, and the resolution on the elongation with the gypsum filter, if it's 530 nanometers, you're not resolving any of these very small particulates.

Q. So you called it a bundle. Where are the fibers?

A. Well, you can't see it there, but you can see the fibers in the dispersion staining on both the perpendicular and the parallel orientations.

Q. Those are the first two pages we looked at?

A. Yes.

Q. Okay. Explain how you selected the refractive index liquid when you conducted -- when you're conducting analysis.

A. The 1.605 is a common refractive indices liquid that you can use. You can use 1.605, you can use a 1.63 or a 1.64; but that's, in my opinion, the most common refractive indices liquid for amphiboles.

Q. When you call it the most common, is that -- can I find that in the peer-reviewed literature?

A. Let's see. Would it say the most common? I don't know. But -- you know, I won't waste time, but in the one they'll talk about the different refractive indices liquids. You can use others.

Q. And you're looking at Exhibit 4, which is the 22262 part 1?

A. Yes.

Q. I'm looking at page 15 where it says, under 7.1.4.1, RI liquids in the range of 1.605 to

1.660 are required at intervals of 0005.

Do you see that?

A. Yes.

Q. Okay. Is it what's in 7.1.4.1 that led you to 1.605 as the RI liquid?

A. Yes and no. Yes, it states that 1.605. But, no, it's the common refractive indices liquid that we use that's in the R-93, so it's one of the common refractive indices liquids for this type of analysis.

Q. Okay. Did you use liquids at intervals of 005?

A. No. We just use 1.605.

Q. Can RI liquid 1.605 determine whether a particle is anthophyllite?

A. Yes.

Q. Can it be used to determine whether a particle is talc?

A. Yes. You can determine the difference between the talc and the anthophyllite and the tremolite in 1.605.

You can use 1.55 if you want further identification.

Q. What color would anthophyllite appear as using the RI liquid 1.605?

A. Under dispersion staining it's typically a lightish gold versus a darker, yellowish gold on the tremolite, as I recall correctly.

Q. What about talc, what color does that show up?

A. Anywhere from very bright, like as can be seen in this, to, depending on the thickness, to a bluish kind of grayish color.

Q. Okay. If the talc folds up on itself, will it appear as a different color, that part that's folded up on itself?

A. We've never seen that, but I don't believe so, no.

Q. Okay. Does the peer-reviewed literature tell you what the colors will be for RI 1.605 for anthophyllite talc and tremolite?

A. Yes. Depending on what type of microscope you have, if it's got an angular condenser lens and what the temperature is, you can go through the wavelengths of light and colors and pick out the refractive indices for these particular types of amphiboles.

Q. Okay. Would you expect sometimes using RI liquid 1.605 for anthophyllite to turn up as a color that's completely different from lightish gold?

A. Sometimes that happens, depending on the thickness of the bundle, because of the way it's transmitted through the light, so then you have to look more around the edges of the bundle to get the appropriate colors.

But I've seen it go from everything from a goldish yellow to a reddish to a blue when you get these really thick, multifiber bundles.

Q. And where can I find in the peer-reviewed literature this range of colors and what they correspond to under RI 1.605?

A. The Su article. Or any article that tells you how to do polarized light microscopy. You can go back to the early McCrone particle analysis.

MR. CHACHKES: Okay. Let's mark as the next Exhibit 25.

(Defendants' Exhibit 25 was marked for identification.)

Q. (By Mr. Chachkes) Okay. In your expert opinion, is -- this is a talc particle and an anthophyllite particle?

A. Well, you have one -- two talc particles that you can see for sure. This is out of focus. And then you have the anthophyllite asbestos bundle.

Q. So the -- I'm focusing on the talc

particle in the center. It's your opinion that what happened is there's an anthophyllite fiber that has the exact length and is perfectly flush with the talc particle that happened to match perfectly that edge?

MR. CIRSCH: Object to form.

THE WITNESS: Yes.

Q. (By Mr. Chachkes) Okay. And is there a chance that that actually is just the rolled up edge of a talc?

A. No.

Q. And why do you say no?

A. Because you have some rolling here a little bit. But it doesn't matter if it rolls up; you're not going to get the same color like that.

Q. And you said that you can get a range of colors for anthophyllite, including red and blue. Does the same apply for talc?

A. No, that's not what I said. I said if you have a very thick bundle, you're going to have the range of colors. And it happens with the actinolite/tremolite also, but you do get the primary colors. Once it gets to a certain thickness, transmitting through the light is different. So we have some examples of those somewhere where you can get the appropriate colors. That's not rolled up

talc.

Q. Okay. And do you have a reference in mind, peer-reviewed reference, that shows you what a rolled up talc looks like in a PLM?

A. I've never seen a peer-reviewed reference that shows what that looks like. You know, I'll quote from Walter McCrone himself that he's never seen a rolled up talc particle.

Q. And you're citing what paper?

A. It's in my report, the reference to it, where he says exactly that he had -- for whatever reason, that I have never seen a rolled up talc particle.

Q. Do you know what refractive index liquid it takes to make the distinction between anthophyllite and talc?

A. You can use -- this is in 1.605.

Q. Okay. Go ahead.

A. You can use that. But if you're going to look just at the talc alone, you use the 1.5 fiber refractive indices liquid.

Q. Okay.

A. But you can't kind of mix and match here. If you're going to -- and we do that sometimes when there's no -- if there's no asbestiform bundles in

it, you'll see in some of our count sheets in there that it will have 1.55.

Q. But it is your opinion that you can use 1.605 to distinguish anthophyllite and talc?

A. Correct.

Q. Okay. Is there additional data concerning the samples upon which you reported ISO PLM, as in a file somewhere in your laboratory but not printed out or produced?

A. I don't believe so. I tried to produce everything that we took.

Q. Okay. Was there any data generated in connection with ISO PLM analysis in this case that was either thrown away or deleted?

A. No.

Q. What are the differences, if any, between how your analysts employed the Blount method and how it is actually written in the 1991 article?

A. The only difference is it's unable to really interpret how she counts the particulates or if she is counting the fibers per milligram of material. We've looked at that.

So she gives it in numbers of fibers or numbers of bundles per milligram, a number count, which is the same thing we do, of course, in the TEM,

where we just follow the procedure here for the ISO 22262-1 for an estimated weight percent.

Q. Okay. But otherwise, you followed the 1991 Blount method to the letter?

A. **Pretty much.**

Q. Following the Blount concentration, your analysts conducted PLM pursuant to ISO 22262-1 PLM method; right?

A. **That's correct.**

Q. Blount did not use that 22262-1 PLM; correct?

A. **No, she used a fiber count method so that if you look at her data, I think she has anywhere for that sample I, which is the Johnson & Johnson Vermont sample, 1989-1990, she finds in the range of about 100 to almost 235 milligrams -- fiber/bundles per milligram. So if you multiply that by 1,000 she's finding the ranges of concentrations at the higher end that we are.**

Q. And --

A. **So we followed the counting rules for estimating weight percent. She did what we do into the TEM and did a number count per milligram of talc.**

Q. Dr. Blount's paper includes a particle size distribution analysis; correct?

A. **Particle size distribution analysis for the length and size of the asbestos -- tremolite asbestos she was finding in the PLM, yes.**

Q. And she plotted the aspect ratios of the particles she viewed by PLM?

A. **The fibrous asbestos, yes, she did.**

Q. She did this because asbestos has a characteristic distribution?

A. **Milled tremolite has a characteristic distribution, yes.**

Q. Okay. And the nonasbestiform version of the same amphibole has a different characteristic distribution?

A. **Yes, it does.**

Q. And you did not generate a particle size distribution chart like the one in Blount's paper -- the ones in Blount's paper in your report?

A. **Not for the MDL samples, no. We did for the original analysis so that we could compare it to the NIST tremolite asbestos standard, to Blount's particle size, as well as the Campbell particle size.**

Q. You included a table with average particle size that your analysts recorded by TEM, however, though; right?

A. **Correct.**

Q. Dr. Blount included particles in her particle size distribution that were below the 3-to-1 aspect ratio; correct?

A. **That's correct.**

Q. Do you have any other opinions regarding Dr. Blount's 1990 or 1991 papers in this case beyond those expressed in your report and that we just discussed?

A. **No.**

Q. Is additional data concerning the samples upon which you reported for Blount PLM in a file somewhere in your laboratory but not printed out and produced?

A. **No. We've produced everything that we generated for the MDL.**

Q. Okay. And all data and material information generated about your work for the Blount PLM was produced?

MS. O'DELL: Object to the form.

THE WITNESS: As far as I know, everything was produced for all the data we collected for the MDL samples.

Q. (By Mr. Chachkes) Okay. And I think I already know the answer, but I'm going to ask it. And any of the data you generated for your Blount PLM

analysis, was any of it thrown away or deleted?

A. **No. We have many negatives, we have many positives, so we just reported what we saw.**

Q. In your report at page 8 you state that you found fibrous talc in 98 percent of the Italian and Vermont talc samples by ISO 22262-1; correct?

A. **That's correct.**

Q. What's your definition of fibrous talc?

A. **Has greater than .5 micrometers in length, has parallel sides, and it has at least 5-to-1 aspect ratio.**

Q. Is there a scientific consensus that there is such a thing as fibrous talc?

MR. CIRSCH: Object to form.

THE WITNESS: I don't believe so.

Q. (By Mr. Chachkes) Are you aware of any epidemiologist or doctor who has studied the health effects of fibrous talc?

A. **I don't testify about health effects of fibrous talc or regulated asbestos, so I don't have any opinions about that one way or the other if anybody has studied it. That's not my area.**

Q. You were disclosed for health and regulatory definitions of talc; correct?

MS. O'DELL: Object to the form.

THE WITNESS: I don't believe so.
Q. (By Mr. Chachkes) Okay. And you're not here to testify about health and regulatory definitions of talc?
A. **I'm not testifying that fibrous talc has any impact on the human body whatsoever.**
Q. Are you aware of any regulatory definitions of fibrous talc?
A. **Fibrous talc for the protocols that we follow is not deemed a regulated asbestos fiber. We just follow the same counting rules that we do for asbestos to characterize what we're looking at.**
Q. So ISO 22262, parts 1 through 3, they don't define fibrous talc; correct?
A. **They define anything that is an elongated structure and fibrous that if you care to write down your findings you could put it in.**
Q. So they define fibrous talc in that way?
A. **They define elongated fiber materials that you're going to -- if you wish to count into the TEM, any elongated structure.**
Q. Okay. And so it's your testimony that ISO 22262 was meant as a method to count fibrous talc?
MR. CIRSCH: Object to form.
THE WITNESS: I didn't say that.

Q. (By Mr. Chachkes) Is it a method to count fibrous talc? Is it meant as such as method?
MR. CIRSCH: Object to form.
THE WITNESS: I don't know what it was meant for, but it gives you the tools if you wish to do that. They don't restrict what you can or can't count. Nowhere in the method does it say don't count the fibrous talc.
Q. (By Mr. Chachkes) And can you identify anywhere where there's a method and a peer-reviewed literature or peer-reviewed publication where it expressly refers to fibrous talc and a method to count fibrous talc?
A. **All the methods allow you to do that.**
Q. Yeah, I'm not asking about what methods allow you --
A. **You interrupted me.**
Q. Okay.
A. **It's late.**
All the methods give you the tools to do that if you wish. No method out there says do not count this particular type of structure. Just like in Blount, where she counted the particulates and tried to get a ratio of how many amphibole asbestos was for every number of particulates. The

information doesn't change because somebody doesn't say one way or the other if you should do it.
Q. It's a simple question, if you would answer the question I'm actually asking, which is is there a published or peer-reviewed document that you can point me to that expressly talks about a way to count fibrous talc?
MR. CIRSCH: Object to form.
Q. (By Mr. Chachkes) Putting aside whether you can use some other method that doesn't say the phrase fibrous talc -- to count fibrous talc, is there something that expressly refers to fibrous talc and a method to count it?
MR. CIRSCH: Object to form.
THE WITNESS: I'd have to go back and relook. None of the methods say do not count fibrous talc.
Q. (By Mr. Chachkes) Sitting here -- okay.
MR. CIRSCH: Let him finish.
THE WITNESS: None of the methods say do not count fibrous talc.
Q. (By Mr. Chachkes) Yes, you said that many times. I'm --
MR. CIRSCH: You're interrupting him again. Stop. Stop.

THE WITNESS: Let me start over. I lost my train of thought.
None of the methods say do not count fibrous talc. The 7402 -- NIOSH 7402 specifically says if it's fibrous talc, count it, in TEM. That's one. And I'll have to --
Q. (By Mr. Chachkes) So --
MR. CIRSCH: You keep interrupting him.
MR. CHACHKES: I'm asking just to save --
MS. O'DELL: No, you're interrupting him.
MR. CIRSCH: You keep doing it, Alex.
THE WITNESS: So that's one.
Q. (By Mr. Chachkes) NIOSH?
A. **NIOSH 7402 TEM method, where you're determining the percentage of asbestos -- regulated asbestos defined by the counting rules versus other things, and it actually has talc in there.**
Q. Okay. So in there I can look, and it will say here's how you count fibrous talc?
A. **I don't think they put it that simply. But if you have knowledge about the protocols and read through it, you would understand.**
Q. Okay. Putting aside whether there are documents that don't expressly say you can't use them for this purpose, is there a document that says this

is how you count fibrous talc, using the phrase fibrous talc?

A. They all say it because they say this is how you define a fiber. Then how you identify what that fiber is, you can make that decision. But every one of these TEM protocols say this is the definition of a fiber.

Q. Putting aside protocols and publications that talk about fibers generally, and putting aside your continued insistence on talking about things that don't say something, is there something that actually says this is how you count fibrous talc, using the phrase fibrous talc?

MR. CIRSCH: Object to form.

THE WITNESS: It is my opinion that they all give you the tools to count fibrous talc. Do they actually say what every mineral -- elongated particle mineral is that you should or should not count? I'd have to go back and check.

I'm going to give you the same answer for the same question. They all provide you the tools or the counting procedures to count whatever elongated particle you want and identify it.

Q. (By Mr. Chachkes) So sitting here today, you can't tell me a counting protocol that expressly mentions this is how you count, mentioning the phrase fibrous talc?

MR. CIRSCH: Object to form. He's answered the question. I instruct him not to answer any further.

MR. CHACHKES: You're instructing him not to answer?

MR. CIRSCH: He answered the question. I mean, you're badgering him now with the same question over and over again.

MR. CHACHKES: I'm asking a different question.

MS. O'DELL: Alex, I'm sure you're aware --

MR. CHACHKES: Who's objecting here?

MS. O'DELL: I'm objecting right here, and I'm sure you're aware --

MR. CHACHKES: Okay. Can we just keep it to one person? It's a much more controlled environment when we do that.

MS. O'DELL: Let me -- don't interrupt me.

MR. CHACHKES: Okay. Wait. Which Lee is objecting?

MS. O'DELL: CMO 11, as you know, Alex, requires you to --

MR. CHACHKES: I'm sorry, are you testifying about a document?

MS. O'DELL: I'm telling you what the order says.

MR. CHACHKES: Oh, okay. I'm sorry.

MS. O'DELL: You may not be aware of the order since you've not appeared in the MDL, but it says to --

MR. CHACHKES: Actually --

MS. O'DELL: -- treat the witness with civility and respect.

He's answered your question, and you should stop badgering him.

MR. CHACHKES: Okay. Your objection's been made.

Q. (By Mr. Chachkes) Are fibrous talc and asbestiform talc different?

A. No.

Q. In your report at page 30 you write that others have reported that fibrous talc is a geological metamorphic transformation of anthophyllite to fibrous talc?

A. Yes.

Q. Okay. And then you cite a couple of things. There's an MVA report -- two MVA reports, right? You can go to page 30, footnotes 42, 43.

A. It should be reference 30, Virta, The Phase Relationship of Talc and Amphiboles in a Fibrous Talc Sample, Bureau of Mines report is one. Veblen, 29, New Bio -- it's late -- I can't even pronounce it -- Biopyriboles, Chester, Vermont, talks about the polymorph transformation. That's how fibrous talc is generated --

Q. Okay.

A. -- is the -- during way back when, during pressure and temperature, when you had the liquid rock and -- depending on the minerals. Those are two references and there's others. I didn't put all of them in there.

Q. Okay. Let's talk about two references you did put in. You put in two references to MVA reports, footnotes 42 and 43; correct?

Am I correct that 42 and 43 --

A. You are correct.

Q. Okay. And those are reports prepared for plaintiffs in talc litigation?

MR. CIRSCH: Object to form.

THE WITNESS: That's my understanding.

Q. (By Mr. Chachkes) Okay. In your footnote 42, you have the date of the MVA report as 2018, but it was actually from 2017; correct?

A. That's correct.

Q. These MVA reports you cite in footnotes 42 and 43, those were not published; correct?

A. No, sir.

Q. And they're not peer-reviewed?

A. As far as I know, they haven't been published.

Q. And they're not peer-reviewed, are they?

A. Well, if you're talking about peer-reviewed in a publication, no.

Q. Okay. Is there another form of peer review you're aware of?

A. Well, any time anybody looks over a report and writes comments about it, it's peer-reviewed.

Q. So would you call your expert report in this case peer-reviewed?

A. No, sir.

Q. Didn't Rigler look over it?

A. I'm talking about peer review where people are looking for the scientific validity of it. It's not -- as far as I know, the MVA talc analysis has not been published.

Q. Okay. And as far as you know, you don't have any information that it's been peer-reviewed?

MR. CIRSCH: Object to form.

THE WITNESS: You know, I'll give you that. That's correct.

Q. (By Mr. Chachkes) What is MVA? What does it stand for?

A. Millette, Vander Wood & Associates.

Q. And both of these reports were authored by Dr. Steve Compton?

A. Yes, sir.

Q. And you've testified in cases with Dr. Compton before; correct?

A. I understand he's been in the same cases as me.

Q. On plaintiffs' side?

MR. CIRSCH: Object to form.

THE WITNESS: Yes, sir.

Q. (By Mr. Chachkes) Okay. He's also an expert for plaintiffs' attorneys in asbestos litigation?

A. He has.

Q. Describe how your analysts utilized process blanks in their analysis.

A. Every set of samples that are prepared, a process blank is prepared along with it so that everything is done exactly the same except no talc. And then those samples are run through the whole preparation process, and then they are analyzed in the same manner as the talc samples.

Q. Do your analysts run a process blank with every single individual sample?

A. No. Every set of samples that are all prepared at the same time.

Q. Okay. And so for the MDL samples, what would constitute a set in that context?

A. Let me look, because Rigler can talk about it more tomorrow.

So we have a number of blanks, and typically we have a chart that shows which process blanks go to which set of samples.

I'll see if Rigler can bring that tomorrow.

I don't have that information. Typically we give that.

Q. Why do you say Rigler can bring it tomorrow? Was he involved in that process?

A. Well, he was involved putting this report together. And since he's coming tomorrow, maybe he can get in early enough to say which set of samples

were analyzed for each process blank.

Q. Sitting here today, even with the report before you, you can't tell me that?

A. No, I don't see the chart that we have prepared in the past.

Q. Do your analysts run a process blank with every sample analyzed by PLM?

A. Well, you don't have anything that you're generating. A process blank would literally be putting the glass slide on the polarized light microscope and looking at it because you're not filtering anything, you're not using reagents, so there's no such thing as a process blank in polarized light microscopy.

Q. Okay. Does the ISO method provide a process blank protocol?

A. I don't think so.

Q. Do you follow a process blank procedure pursuant to your lab's standard protocols?

A. Yes.

Q. Is that written down somewhere?

A. I believe so.

Q. All right. We would request that be produced.

Turning back to your TEM process blanks,

in your January 2019 report you write that, The process laboratory blanks were prepared in the exact manner as the talc samples but without any talc material.

Does that sound familiar?

A. It does.

Q. Okay.

A. I wrote it.

Q. Was the first step in your process blank protocol centrifuging a centrifuge tube with just heavy liquid and no talc in it?

A. Correct.

Q. The first step of your process blank protocol test tests both -- does it test both the centrifuge tube and the heavy liquid for contamination?

A. Well, since it's in the centrifuge tube, whatever it's touched would be -- you would be measuring that potential for contamination.

Q. It follows that your process blank protocol did not include the portion of your method before centrifugation where you transferred the samples to a balance to be weighed?

A. Since we're putting no talc in it, that's correct.

Q. If there was a contamination on the scale, that would not be accounted for in the process blank protocol; correct?

A. If. Well, there's no evidence that there's an if in the scale. It's not just taken out and poured onto the scale. You use weigh paper. They're very careful about that.

But there is -- so there's no contamination from the scale.

Q. But it's fair to say the process blank protocol does not account for potential contamination on the scale, putting aside whether there's contamination or not?

A. The process blank is everything that is touched: the liquid, the filtration, the filter, the centrifuge tube, the additional material, the apparatus that holds the filter, all that is checked.

Q. My question's about what wasn't checked. Was the scale checked with the process blank protocol?

A. You can't check the scale.

Q. Okay. When you ran your process blanks, that process did not involve scraping samples out of the MCT tubes; right?

A. Scraping samples out of the MC tube -- the tube is cut with a guillotine. The centrifuge tube is cut with a guillotine. There's no scraping for the TEM.

Q. When you ran your process blanks, the process did not involve taking material out of the MCT tubes; right?

A. Sure, it did. It's the same way we take the material out when we do the TEM analysis for the process blanks. The end of the tube is cut where the heavy materials -- the heavy minerals are, and then it's run the exact same way.

Q. Okay. So the process blank protocol did include the portion of your method where you scraped the centrifuge from the tube which is --

A. It's not scraped.

MR. CIRSCH: Object to form.

THE WITNESS: There's no scraping.

Q. (By Mr. Chachkes) Okay.

A. The tip is cut with a guillotine after it's been flash frozen in liquid nitrogen, and then that whole tip is put into a solution and then washed. There's no scraping.

Q. I'll pick a more palatable verb.

It follows that -- so you're saying your process blank protocol included the portion of your

method where you removed from the centrifuge the material with a spatula?

A. There's no removing from the centrifuge tube after the spin-down with a spatula.

Q. Do you just leave the material in the centrifuge?

A. We cut the tip of -- the very bottom of the centrifuge tube off for TEM analysis, and then that whole tip is transferred inside and outside into the solution that is then going to be filtered where you dilute the heavy liquid density material, as we do with the TEM analysis.

Q. What percentage of MAS's work is testing talc for asbestos?

A. A lot.

Q. Over 80 percent?

A. I would say right now that our revenue is approximately 70 percent of talc analysis and everything associated with it.

Q. Is the remaining --

MR. CIRSCH: I don't know if he was -- were you done?

THE WITNESS: Yeah.

Q. (By Mr. Chachkes) Is the remaining percentage primarily testing asbestos?

A. Very small percentage of that. Other stuff that we do.

Q. I'm sorry.

A. Other nonlitigation projects that we do.

Q. Of the 30 percent of your work that isn't testing talc for asbestos, is that -- what's that 30 percent? What are you testing for?

A. Well, we do -- like today, I mean, the analysts have around 100 regular, everyday PLM. It's testing for asbestos but not litigation related.

Q. Okay. My question didn't really relate to litigation related or not.

Of the percentage of your work that's not related to testing talc for asbestos, which is in the range of 30 percent, is it primarily testing other things for asbestos? Strike that. That was a terrible question.

For the 30 percent of MAS's work that is not testing talc for asbestos, is that remainder primarily testing for asbestos in other materials or testing asbestos itself?

A. Well, let me back up. All our litigation work is approximately 70 percent. I would say talc is approximately, of that 70 percent, maybe 35, 40 percent.

And then the other portion of that 70 percent would be other litigation, other asbestos testing, non-talc work. And then we have 30 or 35 percent nonasbestos work.

Can we go off the record for a minute?

MR. CHACHKES: Sure.

(Off the record.)

(Recess from 7:56 p.m. to 7:58 p.m.)

Q. (By Mr. Chachkes) What was the approximate dates when MAS tested the samples that are discussed in your January 2019 report, from approximately what date to what date?

A. You can look through the chain of custodies or look through the -- but I think it was like November, December, October, maybe.

And I want to circle back for a second just to clarify. I misspoke earlier. The 70 percent is not talc litigation or talc testing. It's approximately 30, 35 percent of what we do. The remaining 30 percent is nonlitigation work. So I know I misspoke earlier.

Q. Okay. Just to make sure the record's clear, so you're saying about 70 percent of your work is litigation related, about 30 is not?

A. Correct.

Q. Okay. And of the 70 percent, roughly half of that is talc related, the other half is roughly asbestos litigation related?

A. Correct.

Q. Okay. And of the 30 percent that's not litigation related, what percentage of that is related to testing for asbestos in any context?

A. Well, that would be encompassed in the 70 percent. So I haven't broken that out, but the other 30 percent is things like VOC testing for consumer reports or just materials analysis or projects.

Q. Just -- what's VOC?

A. Hmm?

Q. I don't know what VOC is.

A. Oh. Volatile organic compounds. It's green labeling, furniture testing, pharmaceutical work for our FDA certification -- not certification but our FDA lab number.

Q. So --

MR. CIRSCH: Were you done, Bill?

THE WITNESS: Yes.

Q. (By Mr. Chachkes) I recall that I had asked you a question about when you did the testing for the samples in your report, and you said

November, October, December?

A. It's all in the reports. You can go through the chain of custodies, you can see the dates on the analysis.

Q. And what year? 2018?

A. Yes, sir.

Q. And during that time frame were you testing other samples of talc for asbestos?

A. Yes.

Q. And during that time frame were you testing other materials, not talc, for asbestos?

A. Yes.

Q. In that time frame were you testing asbestos?

A. Well, we were doing regular PLM for products for added -- that have asbestos added to it, such as chrysotile, typically see chrysotile most of the time, some amosite.

Q. Okay. Any products that you were testing that have either tremolite or anthophyllite in them?

A. Other than cosmetic talc, no.

Q. How many TEMs does your lab have?

A. Four.

Q. Do you use all four at the same time?

A. If four analysts are busy, yes.

Q. Are they all in the same room?
A. **No.**
Q. Are they each -- do they each have their own TEM room?
A. **Yes.**
Q. So in a given TEM room is it just the TEM there that's for testing?
A. **Correct.**
Q. There's no PLM or XRD in the TEM room?
A. **No.**
Q. Do you use the same PLMs for asbestos-containing material as you use for testing talc?
A. **No. We have a specific PLM scope that has been modified to enhance sensitivity.**
Q. So that PLM is only used for talc?
A. **Yes.**
Q. Are your talc samples handled in the same room as asbestos samples?
A. **No.**
Q. Does MAS have a clean room?
A. **We don't have a Class 100 clean room. We have a specific room set up just for cosmetic talc.**
Q. And what steps -- why haven't you constructed a clean room?

MR. CIRSCH: Object to form.
THE WITNESS: Because there's no need to. If there's any work that is done on any of these materials, they're done in a biological hood so that if there's any escape of material, it can be filtered. We don't do a clean room.
Q. (By Mr. Chachkes) Okay.
A. **It's a clean hood but not a clean room.**
Q. Okay. So your aliquot of a particular bottle for the purpose of doing a TEM test or whether it's a PLM test, that aliquot's taken out in a hood?
A. **Yes. Your experts have been to our lab and one will be there tomorrow. You can ask him what they see when they get there to get their aliquots.**
Q. Does MAS test -- strike that.
Does the same analysts who test asbestos-containing material in your lab, do they also test for -- test talc for asbestos?
A. **No. The same analysts for PLM? I mean, I guess I need clarification of that question.**
Q. How about for TEM?
A. **TEM, if we have other samples that are being run, the same analyst will do that sample, too, in the TEM.**
Q. Do your analysts wear any sort of special

clothing when testing talcum powder samples for asbestos?
A. **No. They use special hoods. There is no danger of being exposed to asbestos in the talcum powder when you're pulling out TEM grids. It's trapped onto the TEM grids.**
There's never been, that I've heard of, of somebody getting exposed there. Everything is done in safety hoods. So none of our analysts are being exposed.
Q. What was -- is it Dr. Rigler?
A. **Yes, it is.**
Q. What is Dr. Rigler's contribution to your expert report in this case?
A. **His contribution was to review it, to review all the data, to look at the data, make sure it's matched in the appropriate places. And he did the QA/QC report, so you can ask him tomorrow why he didn't put that one chart in. That's primarily it for this report.**
Q. When you say review the data, does that mean he reviewed it in the same substantive way that you did to make sure the analysts did their job?
A. **No. But he would review it that the data is there for the appropriate materials. But he**

doesn't review it like I do.
When I review the data, I review every sheet, every micrograph, every diffraction pattern so that I concur with the analysts' findings for the various tests that we've done.
Q. So is it fair to say that his review is more sort of, let's say, a typo level and consistency level as opposed to substantive level?
A. **You'll have to ask him how much substantive level. But he was a TEM microscopist. He knows what the EDS pattern -- EDXA patterns look like and what they should be. He looks for the identification. But his -- but mine's more in depth on the data than his is.**
Q. Okay. Is he qualified to testify about how EDXA is -- EDSA -- EDXA is run?
A. **Sure.**
Q. Okay. And he's qualified to testify how PLM is run?
A. **He's not a PLM analyst. I don't know how much knowledge he has or if he could -- like I could, take me a while to sit down and actually analyze a PLM sample.**
Q. What about XRD, is he an expert in XRD?
A. **I don't believe so.**

20:07:07 **Q.** Okay. What about SAED?
20:07:11 **A. Could he index a diffraction pattern by**
20:07:16 **hand? You'll have to ask him.**
20:07:18 **Q.** Okay. Did he do any sort of substantive
20:07:20 review of the SAED patterns?
20:07:23 **A. He knows the differences between talc**
20:07:27 **patterns and anthophyllite type patterns, but that**
20:07:30 **really was all my responsibility.**
20:07:32 **Q.** Okay. Does he have any responsibility for
20:07:36 reviewing EDXA readouts?
20:07:40 **A. He did review them. He knows EDS spectras**
20:07:45 **and the classic ratios of elements, silica to metals,**
20:07:51 **that you would expect for these types of regulated**
20:07:56 **asbestos fibers and bundles.**
20:07:58 **Q.** Is he qualified to testify to the same
20:08:05 degree and substance as you regarding your January
20:08:08 report?
20:08:09 **A. I don't know. I don't believe -- I don't**
20:08:11 **believe he is as in-depth as I am on this January**
20:08:15 **report with the data. I believe what his**
20:08:19 **responsibility is, he can recognize the appropriate**
20:08:22 **EDS patterns for the appropriate regulated asbestos.**
20:08:26 **He's not a PLM analyst. He has reviewed -- he looks**
20:08:31 **over, makes sure the materials are present, the**
20:08:36 **QA/QC, the chains of custody, that sort of thing.**

20:08:38 **Q.** Could he substitute for you as an expert
20:08:51 in the case presenting this report?
20:08:54 MR. CIRSCH: Object to form.
20:08:55 THE WITNESS: I don't know.
20:08:57 **Q.** (By Mr. Chachkes) That would be a
20:08:58 question for him?
20:08:59 **A. You know, if I leave here and get hit by a**
20:09:02 **bus, I guess we'll find out.**
20:09:05 **Q.** Would that be a question for him?
20:09:07 **A. Hoping that Dr. Longo get hits by a bus so**
20:09:11 **he can step in and take my place?**
20:09:12 **Q.** Let's take the latter first.
20:09:14 **A. You'll have to ask him.**
20:09:15 **Q.** Okay. Why did you involve him?
20:09:21 **A. Because he's one of our senior scientists,**
20:09:23 **and I involved him very early on. Dr. Rigler and I**
20:09:27 **spent a lot of time collaborating together when we**
20:09:32 **initially took on this project.**
20:09:34 **And the main thing was we didn't feel it**
20:09:36 **was the right thing to do to do the TEM long -- what**
20:09:40 **I call the TEM long method, where to get some**
20:09:44 **reasonable detection limits, you have to look at**
20:09:46 **500,000 grid openings. That ties up a TEM too long,**
20:09:52 **and I just didn't think it was very efficient.**
20:09:54 **We talked about the heavy liquid density**

20:09:56 **separation early on, that that was the way to go, the**
20:09:59 **problems associated with it because of the density of**
20:10:03 **anthophyllite without iron versus iron.**
20:10:06 **Chrysotile issue, I'm sure we'll figure**
20:10:09 **out together on how to extract chrysotile using the**
20:10:13 **old Windsor method with citric acid. He's a very**
20:10:18 **bright scientist.**
20:10:19 **Q.** You've issued reports on other bottles of
20:10:22 J&J talc not in the MDL where he wasn't a coauthor of
20:10:25 the report; correct?
20:10:26 **A. Is that right?**
20:10:27 **Q.** I'm asking.
20:10:28 **A. I think he's been on every report.**
20:10:30 MR. CHACHKES: Okay.
20:10:33 I think I have no further questions, but
20:10:36 there are other people, and I'm just going to
20:10:38 maintain the objection I stated at the
20:10:39 beginning, which is we'll have to review the
20:10:43 enormous amount of data that was belatedly
20:10:45 produced and determine whether to re-call the
20:10:46 witness.
20:10:46 MR. PROST: I'm happy to go now. I don't
20:10:50 have much.
20:13:19 (Off the record.)
20:13:19 MR. CHACHKES: Just to amend what I said

20:13:21 before, I'm going to reserve time after the
20:13:23 other defendant or defendants ask their
20:13:27 questions, which will give me time to review my
20:13:33 notes to see if I'm actually done.
20:13:35 EXAMINATION
BY MR. PROST:
Q. Hi, Dr. Longo.
A. Good evening.
20:13:39 **Q.** With respect to Dr. Rigler, did he subject
20:13:41 any substantive changes?
20:13:43 **A. He might have.**
20:13:44 **Q.** You don't recall any as you sit here?
20:13:47 **A. No. I mean, we all have our own editing**
20:13:51 **style. Sometimes he'd say this doesn't make any**
20:13:52 **sense, which is not uncommon with my struggle with**
20:13:56 **the English language.**
20:13:57 **Q.** Okay. You mentioned that you do not store
20:14:01 talc and asbestos samples in the same room at MAS?
20:14:04 **A. Correct.**
20:14:04 **Q.** Do you store all of your talc samples in
20:14:08 the same room regardless of the manufacturer or
20:14:12 supplier?
20:14:13 **A. They are stored in the same room in**
20:14:17 **separate containers, separate sealed bags, and**
20:14:21 **separate locked cabinets.**

Q. Are there other talc samples provided by other manufacturers or suppliers other than Johnson & Johnson?

A. Yes.

Q. How many others?

A. A number.

Q. More than five?

A. I don't know.

Q. And these samples span decades from these other manufacturers as to Johnson & Johnson?

A. Typically.

Q. With respect to fibrous talc, I think I heard you say this, but fibrous talc is not asbestos; right?

MS. O'DELL: Object to form.

THE WITNESS: It's not one of the regulated asbestos types.

Q. (By Mr. Prost) And so no matter the shape or size or aspect ratio, if it's chemically talc, it's not asbestos?

A. It is not one of the regulated asbestos types that we would report as asbestos.

Q. You attempted to quantify the fibrous talc in your most recent January 15, 2019, report; is that right?

A. Yes.

Q. And just describe briefly how you did that.

A. It's very qualitative. The analyst for each of these samples going all the way back, they make an estimate of the number of particles they're seeing in the grid openings as they go through their 100 grid openings.

At the end of that analysis, they'll state that I was typically seeing one or two or three, and then they'll record one of the typical asbestos talc fibers, diffraction pattern, EDS.

So it's a qualitative estimate.

Q. In your March 2018 report, did you attempt to quantify the fibrous talc?

A. We collected the data, as I recall, but I didn't go through the exercise of just doing the math.

Q. Why did you change your methodology in the quantification of fibrous talc between your March 2018 report and in your most recent report?

MR. CIRSCH: Object to form.

THE WITNESS: I became curious on how much fibrous talc is in the samples where we're seeing fibrous talc. Some samples we see it,

some we don't, especially by TEM. PLM, it's just about in every sample.

With the heavy liquid density separation, you know, theoretically, you should be removing all the fibrous talc along with the platy talc, but there is some fibers in there.

A true quantitative analysis where -- is to take any of these samples that have fibrous talc in and do a regular no heavy liquid density separation and see how many orders of magnitude the fibrous talc is compared to what we're seeing in TEM with the heavy density liquid separation.

Q. (By Mr. Prost) On page 13 of your January 2019 report, you quantify it as abundant, common, or trace; is that right?

A. Yes.

Q. And is there any published or peer-reviewed literature that guided those categories, or is that something that you or MAS came up with?

A. It was our collective -- what would you say is trace, how do we kind of give some information about it, because that's what we were doing for a while.

Now we're just using the trace as it's one to three, on average, per opening. And to do the analysis or do the semiquantitative estimation of the number of fibrous talc structures per gram, we just use one per grid opening.

Q. So there is no established standard for those three categories that you relied upon?

MS. O'DELL: Object to the form.

THE WITNESS: I don't think I've seen a document that says if you see fibrous talc, if you only have one or two particles, that it's trace. And it's not -- it's trace compared to what you're seeing there so that you can give some qualitative estimate.

And we were using this before I got the idea of actually doing a qualitative count based on one fibrous talc structure per opening.

Q. (By Mr. Prost) Have you done any quality assurance reports for fibrous talc?

A. No, sir.

Q. And how long have you been analyzing materials for asbestos content? When is the first time you did that? How many years ago?

A. The first TEM grids that I ever analyzed are in a -- stuck on a petri dish and I have it on

the wall. I think it was about approximately 1985 or 1986.

Q. Is the first time that you ever documented fibrous talc 2018?

A. No. I used to do a lot of product ID in the property damage cases, and one of the fingerprints for U.S. Gypsum Audicote Acoustical Plaster was that it had approximately 10 percent International Talc in it. And International Talc, obviously, eventually is Vanderbilt Talc when they bought that. And it was a fibrous talc component, so we were constantly analyzing for fibrous talc.

Because U.S. Gypsum Audicote was the only acoustical plaster out there that had a combination of 10 percent perlite -- excuse me -- 10 percent chrysotile, 60 percent perlite, approximately 10 percent fibrous talc, and the rest of it was bentonite clay, Wyoming type, and then a few percentages, 2 or 3 percent of calcium carbonate.

That fibrous talc was the fingerprint for that product. So we spent a lot of time in these types of situations debating fibrous talc.

And I must have done that -- and that was when I was doing all the TEM analysis on the product ID. I bet I analyzed hundreds and hundreds and

hundreds of samples specifically, besides looking for the other primary ingredients, is looking at and making sure if it was U.S. Gypsum Audicote versus National Gypsum spray -- God, I've forgotten the name -- or one of the other without the fibrous talc.

Q. That was all industrial talc?

A. Yes.

Q. So the first time you would have documented the presence of fibrous talc in cosmetic talc, would that have been 2018?

A. Whenever we first started doing these analyses. I think that was November, December, January, or so, in early 2018.

Q. I know you're not giving any medical causation opinions with respect to disease or ovarian cancer, am I also correct you're not going to offer any opinions as to the root of exposure, whether it be the female reproductive tract versus inhalation; is that correct?

A. That is correct. I will not be giving those types of opinions.

Q. You've never been to a talc mine?

A. I still haven't.

Q. You've not studied the geology of the mines in Vermont or China, have you?

MR. CIRSCH: Object to form.

THE WITNESS: I am not a geologist. My role is what's in the bottle.

Q. (By Mr. Prost) Do you agree that the geologic process that controls the formation of any given talc deposits are unique?

MS. O'DELL: Object to the form.

THE WITNESS: I'm not a geologist. I don't know how unique, especially for the Vermont and Italian mines. We see from those time periods that they have asbestos.

So I'll let other geologists say how unique or not unique they are. That's not my area.

Q. (By Mr. Prost) You would expect the accessory minerals in any given talc deposit to be different from one continent to another, wouldn't you?

MR. CIRSCH: Object to form.

THE WITNESS: I don't have an expectation one way or the other.

Q. (By Mr. Prost) You can't name for me the mines in Vermont that would have been sourced for J&J baby powder, can you?

A. Besides Hammondsville, Argonaut, and

what's the other one? I'm missing one.

Q. You're not able to break down the samples that you've tested in your reports pertaining to any specific mine in Vermont or a year, are you?

A. Without going through all the documents showing that when you switched from Hammonds -- or Argonaut, there's specific years in discovery, but I haven't bothered doing -- I haven't done that, if it's important.

Q. All right. Do you know when Imerys began supplying talc for Johnson & Johnson Baby Powder?

A. It's always unclear to me. Of course, it's the -- in 1980 we have some -- maybe with the Vermont and the later '80s.

I haven't memorized -- and because we've been going so long, I'm tired. I've had that information at the tip of my tongue before, but I would have to look it back up what Imerys says in their sworn interrogatories when they started doing that, as well as Johnson & Johnson when they say they started buying it versus when it was their own mine and that sort of thing.

Q. Are you familiar or knowledgeable regarding the selective mining processes that Imerys would have used?

A. Is that like the video where they were blowing it up?

I'm not here to talk about selective mining processes or not. My role is just an analysis of what's in these particular containers.

Q. You're not familiar or knowledgeable regarding the flotation process that Imerys used over the years, are you?

A. I've read a lot about it. In fact, we're going to use one, I believe, with the citric acid to try to concentrate the chrysotile if present.

So without looking at it and going through the processes that have been stated in a lot of the documents I've read, other than that, no.

Q. Are you aware of any published literature stating that any of the mines used to source Johnson & Johnson Baby Powder were contaminated with asbestos or amphibole asbestos?

A. Published literature versus in-house testing and company's own stuff?

Q. Say peer-reviewed literature.

A. I'm sorry, could you repeat that?

Q. Are you aware of any peer-reviewed literature stating that any of the mines used to source Johnson & Johnson's Baby Powder or Shower to

Shower were contaminated with amphibole asbestos or chrysotile?

MS. O'DELL: Object to the form.

THE WITNESS: I mean, the geological reports that go back and -- and Alice Blount can pick on -- Alice Blount didn't say that this came from Vermont. I assume she knows where, as a geologist, as a consultant, where that talc came for that 1989 or that 1990 bottle of Johnson's Baby Powder that she tested to show tremolite asbestos.

But an actual peer-reviewed publication stating that the accessory minerals are asbestos type or regulated asbestos as counted by these standard peer-reviewed protocols, I can't think of any.

Q. (By Mr. Prost) Have you read Alice Blount's deposition transcript from the Ingham case?

A. I have.

Q. And is it your belief from reading that testimony that she's saying that sample I from her 1990 report was a bottle of Johnson & Johnson Baby Powder?

A. She says it is.

Q. Did you read where she said she bought

that bottle in 1996?

MR. CIRSCH: Object to form.

THE WITNESS: Well, that would have been hard to go back in time with it. I think she also testified that she bought a number of bottles over the years.

Q. (By Mr. Prost) You would agree she was a bit confused in her deposition?

MR. CIRSCH: Object to form.

THE WITNESS: No, sir, I don't make that judgment about anybody.

Q. (By Mr. Prost) I've heard it read and think you've probably been asked this before, but would you agree that less than 1 percent of the amphiboles in the world are asbestiform?

MR. CIRSCH: Object to form.

THE WITNESS: You know, I just don't know what 1 percent of probably, I don't know, how many zero tons of amphibole's out there. Sometimes people seem to suggest that 1 percent isn't very much. 1 percent of something really big tends to be a lot.

Q. (By Mr. Prost) You're familiar with peer-reviewed studies, though, that have said that; right?

A. Yes, sir.

Q. And you don't have reason to disagree with that, do you?

A. No, sir. I'm just curious on if you were to take every amphibole mineral in the world and then say only 1 percent of that is asbestos. There certainly seems to be enough amphibole asbestos in the world to supply a very large contingent of products over the years until it got all banned or no longer made for amphiboles.

So I don't have any -- I can't give you a relationship what 1 percent means. It's not 1 percent of a pound. It's 1 percent of -- I don't know how many -- how you would weigh it all.

Q. I know you might think it's still a lot, but you have no reason to disagree with the peer-reviewed literature that you've seen that has said that less than 1 percent of the amphiboles in the earth's crust is asbestiform?

A. No, sir. I just was curious how much of the crust is made up of the percentage of what the weight is.

Q. I think I've seen you testify before -- and I want to see if you still agree -- if an amphibole is crystallized in a nonasbestiform habit,

no matter how much you can grind it up, it can never turn into asbestos or asbestiform?

MR. CIRSCH: Object to form.

THE WITNESS: It's unclear to me what an nonasbestiform habit is other than you may have massive, blocky. It's all a geological shape.

If you grind up a rock, you do not produce asbestos. If you grind up tremolitic -- massive tremolitic, you typically will get both, but you will not get bundles.

What we do is count it as regulated asbestos per the protocols.

Q. (By Mr. Prost) Right. So if it crystallizes in a nonasbestiform habit, tremolite, for example, and you grind it up and it falls under the counting rules you use, you call it asbestiform, regardless; right?

MR. CIRSCH: Object to form.

THE WITNESS: Well, everything we've looked at has crystallized in a fibrous habit. Asbestiform habit and fibrous habit are the same thing because we're looking at fibers.

If you look at all the crystalline habits, there's a wide range, and most of them are not fibrous, only one where they would call fibrous.

But you're not going to get an asbestiform bundle from grinding up cleavage fragments.

Q. (By Mr. Prost) I'm not talking about what you've seen or looked at or issued in your report; but just hypothetically, if you have nonasbestiform tremolite or amphibole that's crystallized in a nonasbestiform habit, no matter -- if someone were to grind that up so that the shape came out to be, under the counting rules that you go by, you would still call that asbestiform?

MR. CIRSCH: Object to form.

THE WITNESS: Well, it's a hypothetical I don't believe exists. If you grind up a rock or something that's massive, you get little pieces, irregular shapes. To get a perfectly parallel side I think is rare.

And you have to look at what else we're seeing here. Every bundle is asbestiform. And you would think you would have the same type of crystalline habit that is generating both asbestiform as well as some cleavage fragments. We do see cleavage fragments. But it's my belief you get both. It's never one or the other.

Q. (By Mr. Prost) If an amphibole is

fibrous, in your opinion, is it necessarily asbestiform?

A. In my opinion, if it is fibrous, it is asbestiform because it has a form like asbestos.

Q. Are you aware of any peer-reviewed studies to support that?

A. Other than --

Q. I'm sorry, that if an amphibole is fibrous, it necessarily has to be asbestiform?

A. You know, other than the geological definition for a crystalline habit and that it is fibrous and, you know, whatever the population is, population is more than one.

But we're getting enough data now that these populations -- and you just can't -- you know, no longer look at from a sample from the same mine that it's a unique thing.

All the samples from the mine that we're seeing over and over again show asbestiform minerals in it, specifically tremolite series and the anthophyllite series.

It's just my opinion. I mean, others may disagree, but that's my opinion.

Q. Is there a specific article or peer-reviewed literature or study that says if you

have an amphibole and it's in a fibrous form, that it is necessarily asbestos or asbestiform?

MR. CIRSCH: Object to form.

THE WITNESS: Every protocol that we're using here has a definition of what you call a regulated asbestos. Everything that I have reported has followed the peer-reviewed protocols and methods to say it is a regulated asbestos that is fibrous to whatever degree they use for their counting rules. In my opinion, that makes it all asbestiform.

Q. (By Mr. Prost) So the counting rules and the protocols that you used for your reports are what you're talking about?

A. Yes, sir.

Q. No other articles or papers that you can think of?

A. Not as I sit here this second, no.

Q. Are you aware of any peer-reviewed articles or literature that say the opposite, that you can have fibrous amphiboles that are not asbestiform?

A. There's a couple.

MS. O'DELL: Object.

Q. (By Mr. Prost) And who would those be

from?

A. Oh, I think Ann Wylie has published one or two. Just depends on who the authors are.

Q. And you just disagree with that?

A. Well, I don't agree with their opinions that if it is a bundle. But I disagree that if you take an individual fiber that you can't tell one way or the other because it has the same chemistry, it has the same crystalline pattern, it has the same surface charge, and it's called a regulated asbestos fiber, if it meets all that counting criteria. In my opinion, if it is fibrous and it is asbestos, it is asbestiform.

Q. I know you think that or you testified that high tensile strength and flexibility don't mean much because they can't be measured, I think; is that a fair way of describing what you've said or what your opinion is?

A. Well, it's not defined. And both the polarized light microscope as well as the transmission electron microscope do not have any ability to make those measurements. It's just a general description.

Q. Wouldn't you agree that there's ways to observe whether something has high tensile strength

and flexibility?

A. Sure. If you go to the mine and get a -- I think a 10 centimeter sample is the minimum, and tape it to paper and go put it on an Instron, which is a device that will measure tensile strength, I wouldn't want to be standing around when you do it. Because when they pop, they'll spread fibers everywhere because you're just dealing with large bundles.

With a transmission electron microscope, with a polarized light microscope, or even XRD, it's impossible. There is no ability to make that measurement. And standard protocols for making determinations or measurements lay out how you do that. They don't even define what high tensile strength is.

Q. Under PLM, is it your opinion that -- sounds like it is your opinion -- it is impossible to make a determination whether a population of fibers or a bundle has high tensile strength or flexibility?

A. It is impossible. And they don't provide you any method for doing that.

Q. In terms of curvature, splayed ends, parallel sides, that sort of thing, you don't think that gives any guidance on the observance of high

tensile strength and flexibility?

MR. CIRSCH: Object to form.

THE WITNESS: No. You know, if you're going to look at the published literature for high tensile strength for chrysotile, amosite, and crocidolite, you're running around 90,000 to 120,000 psi.

If you look at what the characteristics or tensile strength is for tremolite anthophyllite, it's about 4,000 psi, and it's brittle. And you're milling it.

So if you can see the bundles at times that we get, you can see where it has been milled and broken in half. There's nothing there to do that.

When we identify regulated asbestos in the PLM method, it meets the criteria for what they say is regulated. It has -- those individual fibers and those bundles are all greater, typically, on average, greater than 20-to-1.

They can be broken down to smaller fibers and bundles. It's greater than -- the width of the structure is greater than 5 micrometers. It meets the criteria for the ISO 22262-2.

Nowhere in any of that method does it tell

you, oh, you better measure the tensile strength.

Q. (By Mr. Prost) The 34 or 35 samples from your March 2018 report, you're still relying upon the results of that report here in the MDL; is that right?

A. No, I'm not. I'm relying on the MDL report. The only thing that the MDL does is verify our earlier findings, but I'm not relying on it here.

Q. Well, your MDL report includes the findings of positive of what you're calling asbestos, though, in those -- in terms of your computations of the percentages?

A. I'm sorry, could you repeat that?

Q. Sorry, it was -- yeah, clumsy.

In your January 2019 MDL report, you're including the findings of those original Johnson & Johnson samples, those 35 in your overall percentages, aren't you?

A. No. The only thing that's in there that came from the original report is that MDL sample, the 1978 MDL sample. That's the only sample.

Q. You changed your methodology from the March 2018 report until now. Why did you do that?

MR. CIRSCH: Object to form.

THE WITNESS: Because we -- we didn't really change it. We just started using the definitions and the ability for the ISO 22262-2 because it's an International Standard that has been peer-reviewed by all the international scientists that are on it or in the committees, and it provides a standard method other than just the Blount heavy density liquid separation and TEM.

Q. (By Mr. Prost) Is the method you're doing now more reliable than what you did last year?

A. **No.**

MR. CIRSCH: Object to form.

THE WITNESS: They are both reliable.

Q. (By Mr. Prost) Is your concentration preparation any different now than what you did in early 2018, that first report?

A. **No. We are using the exact same method, except the ISO 22262-2 says use heavy density liquid of 2.85, if I remember, and Blount had said 2.81.**

So now I have a method that specifically uses 2.85 that we have been using under Blount.

Q. For the Johnson & Johnson MDL samples, I think you testified that some of those containers had been previously opened?

MS. O'DELL: Object to the form.

THE WITNESS: Well, they got previously opened when they were split. I don't have any history on what Johnson & Johnson did with those, but certainly when they got split up in New Jersey for samples, they were opened in some manner.

Q. (By Mr. Prost) The Imerys samples, the railcar samples, I haven't seen any photographs of those, and I think when we talked last time you said you could produce those?

A. **Oh, I forgot. Yes.**

Q. You do have photos of those somewhere that you can produce them?

A. **Yes. It should -- I'll endeavor to get those.**

Q. All right. I guess we'll ask that those be produced.

You're not familiar with how Imerys stored those samples before they were produced; right?

A. **No.**

Q. Or what specific mines they came out of?

MS. O'DELL: Object to the form.

THE WITNESS: Well, I guess it would be easy to track down if there is information and

testimony about when different mines were started and stopped.

Q. (By Mr. Prost) Your opinion on fibers per gram and your extrapolation from what you found in the samples, am I correct that you are assuming that the asbestos contamination is consistent throughout the entire sample?

A. **The accessory mineral -- the findings of the asbestos accessory minerals is consistent throughout. That's not me assuming it. That's the protocol. Because all TEM analysis, air samples, water samples, when you filter it or pull through a filter, you make that assumption.**

Q. Your calculations assume that the fibers are present at the same levels and evenly distributed throughout every milligram of the sample; is that right?

MR. CIRSCH: Object to form.

THE WITNESS: That there will be -- this is what the range is that we should find, as we talked about ad nauseam -- I'm sorry -- we talked about earlier.

If we found one and analyzed it again and found zero, that would not be surprising because we're right at the detection limit. But if we

found a significant number, 10, 15, 25, I would expect that we would find positive samples in each and every -- if we were to do that and do that for some time, that there is enough in there that would make that where we would find similar concentrations.

Q. (By Mr. Prost) So at the detection limit level where you're only finding a couple of fibers, you wouldn't be surprised to examine the same sample and not have a nondetect; is that right?

A. **That wouldn't surprise me, and it wouldn't surprise me if we had found two fibers the first time or two asbestos -- regulated asbestos structures the first time and next time you find four. So you will have a range at those lower detection limits.**

Q. Have you ever done a study to verify the consistency of distribution throughout an entire sample?

A. **No. On the distribution and consistency we haven't done any additional analysis that anybody else has ever done in the past for analyzing these same type of samples other than we're using a more sensitive method.**

Q. You were shown an EDS -- EDXA spectra. I think it was Exhibit 12 maybe, if you could pull that

up.

MR. CIRSCH: You can use this one for now.

THE WITNESS: Oh, thank you.

Q. (By Mr. Prost) You were asked some questions about how at the bottom there's references to the different -- what do you call it -- not minerals -- the components. You see what I'm talking about at the very bottom?

A. In the bottom left-hand corner?

Q. Correct.

A. Yes.

Q. Thanks.

And you said, I think, that you weren't sure if the software automatically pulled up those calculations or the ratios, the different numbers; is that right?

A. That's correct.

Q. All right.

A. It's not so much the ratios; it's that you can do it by elemental percentage or the oxides.

Q. If the software automatically pulled that up, your analyst wouldn't delete it before they printed that, would they?

MR. CIRSCH: Object to form.

THE WITNESS: No. If it is on there for

that particular software, it would be a toggle switch they would either turn on or turn off.

What's more important is we're following the ISO method for quantitative EDS where we have collected the appropriate count times.

Q. (By Mr. Prost) So the analyst could flip a switch, and it could produce those specific calculations for us?

A. I don't know that.

MR. CIRSCH: Object.

THE WITNESS: It was talked about at length earlier. It's not something we routinely do or I'm relying on.

Q. (By Mr. Prost) Is there anything else that you can think of where there's a switch that you could turn off information that the software was to automatically put on there?

MS. O'DELL: Object to form.

MR. CIRSCH: Objection.

THE WITNESS: I never stated that the software automatically wants to do it and the analysts are fighting with the software where the software is saying, no, no, I need to do this.

Q. (By Mr. Prost) I'll rephrase the

question.

Are you aware of any other information that is available on the software that is not on there or that there's a switch that has turned it off?

A. Again, as I discussed earlier some many hours ago, that I would have to check, if my client asks. And if my client asks for me to check, I'll certainly take it under serious consideration.

MR. PROST: That's all I have for now.

THE WITNESS: Thank you.

MR. PROST: Alex, do you have some more questions?

MR. CHACHKES: No.

(Recess from 8:45 p.m. to 8:55 p.m.)

EXAMINATION

BY MS. O'DELL:

Q. Dr. Longo, it's been a very long day, but --

A. Yes, ma'am, it has.

Q. It has, I know, for you. I have a few questions for you.

First, before we begin, would you please describe your educational background, your background and expertise.

A. Yes. My educational background is that I graduated from the University of Florida with a bachelor's of science in microbiology. Went on to graduate school in the materials science department and graduated in 1983 with a Ph.D. in materials science and engineering.

I started a small company, and we were one of the first TEM labs in the country that specialized in the analysis of asbestos by transmission electron microscopy. Went on to in 1988 open the doors of Materials Analytical Services and have been there ever since as president.

While I was at the University of Florida, I stayed on while I started that first little company and eventually became visiting assistant professor at the University of Florida, which I gave up that position in approximately 1986 or so.

Materials Analytical Services grew at some point to almost 80 employees, where we specialized in everything from analysis of asbestos to materials to semiconductors, even doing work for the Department of Defense on various types of contracts.

Since that time, we've probably analyzed somewhere in the order of 300,000 or 400,000 individual asbestos samples. We worked with various

states and agencies in litigation for property damage and developed techniques for reverse engineering asbestos-containing products so you could identify the manufacturer.

And I was the expert for the City of New York, the State of New York, the State of Hawaii, the State of Utah, the City of Chicago, plus the entire school system and public buildings in the State of Texas.

We were the referee lab for the bankruptcies that involved both U.S. Gypsum, W.R. Grace, U.S. Mineral as well -- additionally, Turner & Newall's Limpet, as the referee lab where if somebody had made a claim, it was up to us to validate that the particular sample coming out of a particular building was, in fact, that manufacturer's product.

I have published in the peer-reviewed literature on the types of testing that we've done for both asbestos and nonasbestos type products.

I have taught at the American Industrial Hygiene Association for teaching other industrial hygienists the utility of transmission electron microscopy specifically for asbestos as well as other industrial hygiene applications for particle size

analysis, fugitive type particulates for air quality.

Our laboratory is one of the few in the country that does VOC testing for all the green labeling. We're certified to do that by the ISO certification.

Our laboratory also has an FDA laboratory number so that we do do pharmaceutical or UPS type testing to verify, typically, different chemicals and materials that may be emitted or inhaled or injected or taken by mouth.

I've been doing this for almost 30 years, and my specialty has been and my research over the years has been asbestos-containing products and the propensity or not to cause significant exposure during the use of those products.

I was the primary author of the ASTM Method for the Analysis of Asbestos Fibers and Bundles in Settled Dust, the D2205 committee for ASTM standard method, which is probably the most rigorous peer-reviewed methodology outside of ISO.

To get your committee -- your subcommittee, your committee, and eventually all 40,000 members have the ability for the final time when it becomes a standard to vote negative on it. One negative vote sends it back. I did that once. I

won't do it again.

And I'm a member of various organizations. The American Industrial Hygiene Association, the microscopy -- materials science microscopy, as well as I'm a board certified forensic engineer, which is not just pay your money; you actually have to qualify from your experience and renew that. I finally became a fellow in forensic engineering for what I do.

I guess that's it.

Q. Have you been qualified as an expert in asbestos testing and allowed to testify in federal court?

A. Yes. I've been in federal court many times on our asbestos type work, and in fact I've had a handful of appellate opinions that the methodology we use is sound science. I've been qualified as both a materials scientist in the areas of microscopy, in the areas of asbestos analysis, in the areas of industrial hygiene specifically to do with asbestos. And I'm still not a certified industrial hygienist.

Q. What were you asked to do in this case?

A. I was asked to determine, using standard protocols, peer-reviewed protocols that are normally used for the determination of asbestos in materials,

air, bulk samples, water samples, what have you, if there was in fact regulated asbestos in these containers of Johnson & Johnson Baby Powder, Shower to Shower during the time that Johnson & Johnson was manufacturing that before they sold it to Valeant, Valeant Pharmaceuticals.

And using standard methodology to determine if there was detectable amounts of regulated asbestos in these containers, historical containers as well as more contemporary containers. For this particular case for the MDL we have not gotten to the MDL China mines but to verify if it was, in fact, present or not.

Q. Okay. Is the methodology that you used in your work in this case supported by the peer-reviewed literature?

A. Yes. We're using standard protocols that other scientists in the field of asbestos testing have used in the years.

If there's a publication involving asbestos analysis of some sort or asbestos in some product or asbestos release, the protocols that we use are typically referenced in those peer-reviewed publications as well as these are standards, standard testing protocols that are accepted across the

country for these types of analysis and across the world, especially the International Standards organization protocols that we use.

Q. And is that because of the methodology that you use and because of the fact that it's generally accepted in the scientific community, is the process that you undertook here something that could be replicated by another scientist or lab?

MR. PROST: Objection --

MR. SILVER: Objection to form.

MR. CHACHKES: Objection. Leading.

MS. WOODS: Join.

THE WITNESS: Absolutely. They just would follow the methodology that we have laid out in the reference protocols, and as long as they are qualified that they can do this type of analysis, they should all be able to be replicated.

Q. (By Ms. O'Dell) Let's talk about your results just very briefly.

What were your find -- let me back up and ask this question.

What time period did the samples you tested for your January 2019 report, what time period does that cover?

A. The 1960s, the 1970s, the 1980s, the 1990s, and the early 2000s.

Q. What were the sources from which talc was mined?

A. The '60s up until about '67 or so would be from Italy; from there to approximately 2002, 2003, it would be from Vermont; and after that it's from China.

Q. What were your findings regarding regulated asbestos fibers?

A. Our results overall for 72 what I'll call historical containers that include 15 historical railroad car samples from Imerys, and out of that 72 samples, 50 were positive for regulated asbestos, and that gives you a percentage of approximately 66 percent or so.

If we break it down -- and, oh, that includes seven MDL samples that came from the Korean mine, or what we call the Asian talc.

If we break it down for the Johnson's Baby Powder, we analyzed 34 historical samples with Asian. Out of that 34, 24 were positive, or 71 percent.

We also analyzed 23 historical Shower to Shower containers that were Johnson & Johnson, and 18 were positive, or 78 percent.

Of the 15 Imerys railroad car samples, eight were positive, or 53 percent.

Excluding the seven Asian Johnson Baby Powder containers would give us 65 Johnson Baby Powder and STS and Imerys railroad car samples analyzed; 44 were positive, or 68 percent, for amphibole asbestos.

And then we have a break -- then, of course, we have the breakdown of each of these without the Asian.

Q. What were the results for fibrous talc?

A. The qualitative analysis of fibrous talc -- let me just jump to the results section.

Q. Page 9.

A. Thank you. Been a long day.

Q. Sure.

A. Using the ISO PLM method, found that of the 56 Italian/Vermont/China source containers that we analyzed, 55, or 98 percent, contained fibrous talc. The Blount PLM method showed of the 72, 20 contained fibrous talc.

The TEM analysis showed that -- and I have that somewhere -- that there was similar concentration by the heavy density liquid method by TEM, which is biased against finding fibrous talc,

because unless it has iron in it, you'll have the same density as platy talc.

So, really, the best predictor of fibrous talc would be the ISO PLM that does not use heavy density liquid, and most all the samples except for one that we tested had it in there.

MS. O'DELL: Nothing further, Doctor. Thank you.

THE WITNESS: Thank you.

MR. CHACHKES: Nothing more here.

FURTHER EXAMINATION

BY MR. PROST:

Q. Just one follow-up.

You're talking about the results, Dr. Longo. Turn to page 6 of your report.

You talk about how the analysis of 34 historical Johnson's Baby Powder containers you determined were 71 percent positive.

And then number 2, you say the analysis of 22 historical Shower to Shower, or 77 percent, positive; but the analysis of the Imerys 15 railroad car samples were only 53 percent positive.

Do you have an explanation for the 25 percent difference there between the Imerys railroad car samples and the finished product

samples?

A. Yes, sir.

Q. What is that?

A. Only eight were positive out of the 15.

Q. Do you have an explanation for why there would be such a discrepancy in the positive findings using your methodology?

MS. O'DELL: Object to the form.

THE WITNESS: I don't look at it as a discrepancy. We call them like we see it. So if it's only eight out of the 15, that's all we saw.

Q. (By Mr. Prost) And you expect that if the raw talc supplied had a certain percentage of asbestos, you would see the same percentage in the finished product?

MS. O'DELL: Object to form.

THE WITNESS: No, I wouldn't expect to see the same percentage, usually, because you're -- flotation, you're using various methods. And we don't have a lot of data from the 1990s. So there may be, you know, a difference in the two. But we don't have enough data to make that yet, to make that jump on why one versus the other.

Q. (By Mr. Prost) So your opinion as to what

could explain the difference is that there's a flotation method and it's a small sample size?

A. No. I never said that. I said there is a processing on it, but we don't have a lot of samples from 1990 and 2000. And, you know, we'll just have to see as we go forward with additional testing.

Q. So the smaller the sample size, the less reliable the findings, you would agree?

A. No --

MS. O'DELL: Object to form.

THE WITNESS: I don't agree that the findings are not reliable at all. They are reliable. Why there's 53 percent versus some of the others, you know, hopefully we can answer this question some day. Or we get a larger sample size and see if there is actually a difference.

MR. PROST: No further questions.

MR. SILVER: Hold on. Yes, we do. We have one more. We can feed it to him or just ask him.

THE WITNESS: Why don't you just go ahead and ask me.

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EXAMINATION

BY MR. SILVER:

Q. Dr. Longo, in your report you characterize the Imerys samples as railcar samples. Where did you get that description from?

A. It was on the -- I believe it was right on the containers as well as from the MDL for the chain of custodies that they sent.

Q. And sitting here today, you believe that all those samples were actually railcar samples?

MS. O'DELL: Object to the form.

THE WITNESS: I don't know if they all were. We'd have to look at the chain of custodies. But I think there were one or two that said something different than railroad car samples, but I just characterized them all as railroad car samples.

MR. SILVER: Thank you. No further questions.

(Deposition concluded at 9:14 p.m.)

(Pursuant to Rule 30(e) of the Federal Rules of Civil Procedure and/or O.C.G.A. 9-11-30(e), signature of the witness has been waived.)

(Original transcript sent to Mr. Frost.)

C E R T I F I C A T E

STATE OF GEORGIA:

COUNTY OF HALL:

I hereby certify that the foregoing transcript was taken down, as stated in the caption, and the questions and answers thereto were reduced to typewriting under my direction; that the foregoing pages 1 through 359 represent a true, complete, and correct transcript of the evidence given upon said hearing, and I further certify that I am not of kin or counsel to the parties in the case; am not in the regular employ of counsel for any of said parties; nor am I in anywise interested in the result of said case.

This, the 7th day of February, 2019.

_____

FRANCES BUONO, B-791

Georgia Certified Court Reporter

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